

THE DOCK & HARBOUR AUTHORITY

No. 170. Vol. XV.

DECEMBER, 1934

Editorial

The Port of Bari.

The Port of Bari is situated on the east coast of Italy and its geographical position is such that it affords the speediest connection between Italy and the Balkan Peninsula.

Increased traffic in the Port of Bari during recent years has enforced the need for enlargements, and several new works including the construction of new breakwaters and quays are now being undertaken and should be completed in 1937.

The Government have provided a credit of 167,000,000 lire towards the cost of these new undertakings.

The Port of Bari forms the supplement for this month's issue and an illustrated article appears on another page.

Congestion at the Port of Tuticorin.

The Port of Tuticorin is seriously congested. This congestion has resulted in considerable inconvenience to several Colombo callers. The famine experienced in this part of India has resulted in merchants there importing foodstuffs in considerable quantities, the low freights ruling contributing to bring about this congestion.

According to information received in Colombo there were over eleven ships at Tuticorin Port during the first week of November. It is estimated that about 32,000 tons of cargo of a general description have already been dumped. Rice imports have been extremely heavy, and, in consequence of the congestion, several new shipments of the commodity had to be retained on board callers.

The accommodation at the port is absolutely insufficient, and, as a result of the conditions which prevail there, vessels have been compelled to remain without discharging. This is resulting in great loss to the ships, demurrage being heavy.

Tuticorin is also being subjected to abnormal weather conditions. The rainfall in the beginning of November has exceeded 12 in.

At present landing cargo at Tuticorin is made by means of lighters from vessels lying 6 miles out at sea. New harbour works were started by the Government in 1923 and it was estimated that a protected deep-water harbour for vessels drawing up to 28-ft. of water would be available within about five years, but owing to miscalculations of various sorts there is now little possibility of Tuticorin becoming a first-class ocean port for several years yet. Proposals are also being made for extending the railway to a point in close proximity to the various moorings so that, should the works prove successful, Tuticorin will rank as a first-class ocean port.

The port has its own Chamber of Commerce, European and Indian, and a Port Trust has recently been formed for the regulation of local expenditure. There are several European trading firms in the place. Several Japanese firms have cotton-buying agencies in Tuticorin during the season April to September. The chief articles of import are machinery, grain, cotton piece goods, matches and kerosene oil and coal.

Additional Dock Accommodation needed for Trawlers at Hull.

A strong movement is on foot among the steam trawler-owning companies at Hull to bring pressure to bear upon the London and North-Eastern Railway to provide additional dock accommodation for the ever-expanding fleet of fishing vessels. Within the last two years nearly fifty new steam trawlers of the larger and most modern type have been added, bringing the total now registered at Hull up to 320. The water space at the St. Andrew's Dock and its Extension, however, is still the same area as a quarter of a century ago, and obviously is not now sufficient to give adequate facilities for the great increase in numbers and size. Suggestions have been made that the railway owners might set apart some portion of the adjoining Albert Dock, the home

of the Baltic and Mediterranean trades which in recent years have shrunk and do not fully occupy the berths. The railway authorities, some time ago, did not look with favour on this proposal, and until now the matter has been more or less dormant. An extension westward is hardly practicable, even if the railway owners were prepared to go to the expense. Threats have been made to transfer some of the vessels to other ports, but this is rather premature as the matter has yet to be brought forward in a formal and authoritative manner.

Manchester Ship Canal.

Very satisfactory are the traffic returns of the Manchester Ship Canal Company for the month of October, for again an increase is reported. Receipts amounted to £93,265, compared with £90,192 for the same month of last year. The company reports that the total for the ten months 1934, amounted to £975,732, representing an increase of £56,961 over the corresponding period of last year. The figures are a sure indication of trade recovery, although it has to be admitted that conditions in the Lancashire cotton industry are far from being what they ought to be.

Development of the Czechoslovakian Free Port in Hamburg.

The Czechoslovakian Ministry for Public Works is reported to have decided upon the further development of the Freeport zone in Hamburg. During the coming year a new quay wall and a warehouse and offices are to be built. An electric crane is also to be installed. Certain other improvements are also to be made to the Czechoslovakian port area in the Saale harbour basin.

Shanghai Dry Dock nears Completion.

Plans for the construction of a 600 ft. dry dock, the biggest in Shanghai, will shortly be partly realised when the No. 3 Dock, 375 ft. long, 89 ft. wide and 26 ft. deep, with ample space for expansion to its planned capacity, will be formally opened at the Naval Ministry's Kiangnan Dock, Kiaochangmiao.

The authorities are planning to complete the entire construction programme with the least possible delay. It is expected that following the completion of the first stage of the programme, work on the expansion will be carried out immediately. When completed, the dock will be 600 ft. long, 100 ft. wide and 26 ft. deep. The cost of the first stage of the work is estimated at 1,200,000 dollars.

The construction of the dock, which is capable of accommodating steamers of over 10,000 tons, fills a long-felt need in marine activities in this port in view of its increase in shipping and new regular visits of large liners. To Kiangnan Dock, the construction is the more imperative in view of the increase in business.

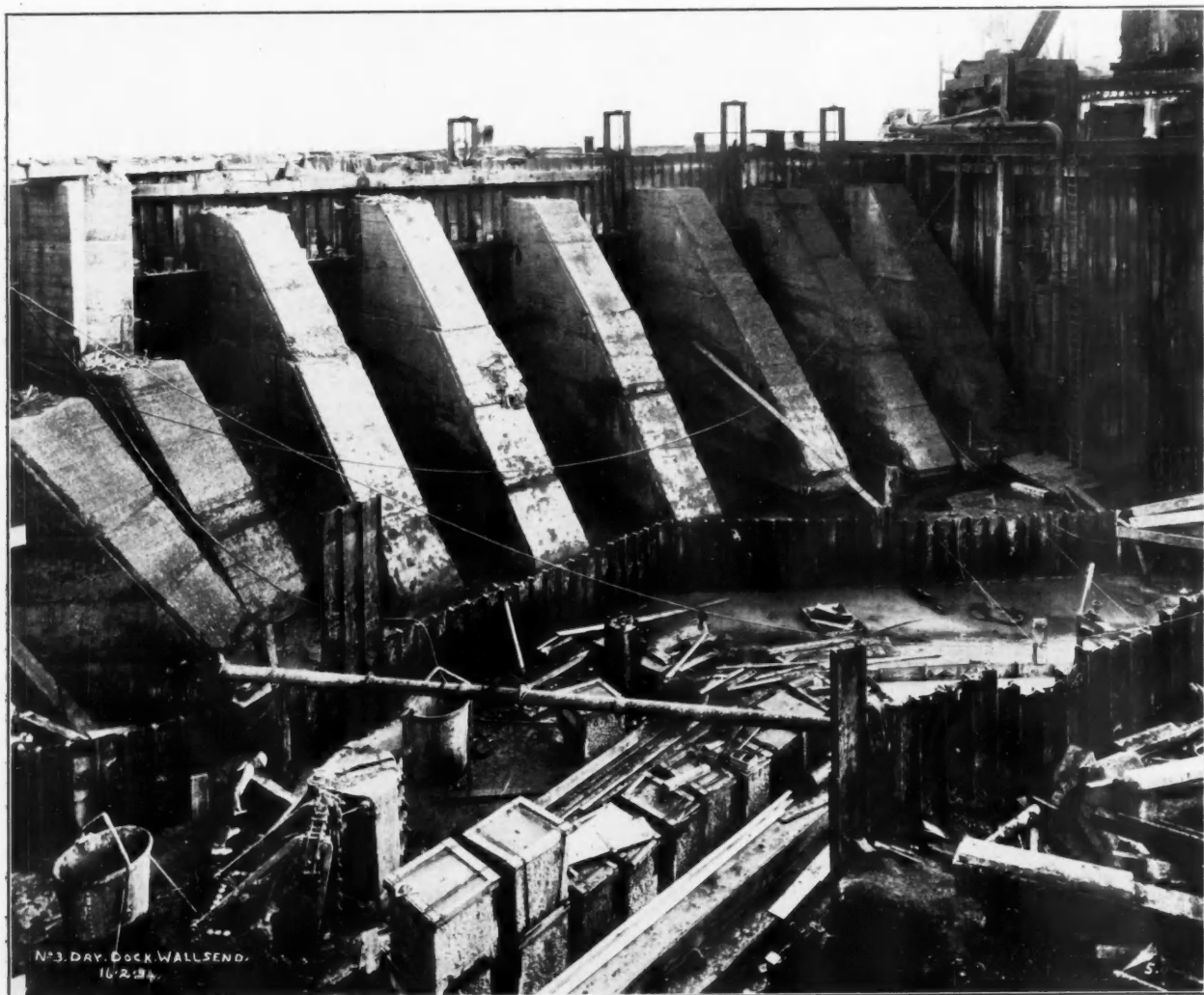
Plans for the construction of the new dock were drawn up more than two years ago after protracted negotiations with the Ministry of War for a large piece of land of the Kiaochangmiao Arsenal, which is adjacent to the Kiangnan Dock for the new dock. These were, however, held up by the Sino-Japanese hostilities in Shanghai. Because of the financial stringency caused by the fighting, the authorities found it necessary to change the original plans. It was then decided that the work should be divided into two stages, so that a comparatively smaller dock may first be constructed to cope with the demand for another dock. A contract was signed in May last year, and the work was immediately started.

Established 69 years ago, according to the "Far Eastern Review," the Kiangnan Dock was originally attached to the Kiangnan Arsenal, but was later divided into two separate organisations. Since the inauguration of the National Government, the Kiangnan Dock was put under the direct control of the Minister of Navy.

New Graving Dock Constructed at Wallsend



No. 3 Dry Dock at Wallsend. View of the forward end completed. In the middle distance, bulk excavation between the walls is being carried out.



Cofferdam at No. 3 Dock. View showing the temporary Concrete Buttresses and the Interlocking Steel Piling.

New Graving Dock Constructed at Wallsend

A NEW graving dock has been constructed for Messrs. Swan, Hunter & Wigham Richardson at Wallsend, and the completion of this new dock will be a welcome addition to the two existing graving docks. The Company also had two floating docks, which served a very useful purpose for about half a century, but which in the course of time became inadequate for modern requirements. The basin in which these floating docks lay was restricted in size, and was unsuitable for a floating dock of dimensions to satisfy requirements. Accordingly, in order to increase docking accommodation, the only course open was to build another graving dock parallel to the two existing docks. This involved the demolition of docks' offices and a platers' shed. The offices were moved to a more convenient building and the platers' shed, which is now a fine building about 250 feet long, was re-erected on a more convenient site at right angles to the head of the new graving dock, and is equipped with the latest machinery.

This new dock, known as No. 3, is larger than either of the two older docks. Its dimensions are 570 feet in length, 80 feet wide at entrance, and with a depth of 26 feet over the sill. Between No. 3 dock and the next dock there is a width of 35 feet, giving room for three lines of railways and a 50-ton electric travelling crane.

The construction of the new graving dock was entrusted to Sir Robert McAlpine & Sons, who began work in February, 1933.

The first work to be undertaken was the construction of a cofferdam, to cut off the new dock area from the river. This cofferdam consisted of interlocking steel piles, reinforced by massive temporary buttresses.

During the construction of this cofferdam excavations at the bow or forward end of the dock were vigorously carried on. The whole of this area was excavated to a depth of 15 feet below cope level. Trenches were then cut in which to build the walls, pneumatic spades being used for the excavation. They had to pass through a quantity of stiff boulder clay before coming to foundation level which was in sand and clay. The trenches for the walls were temporarily lined with interlocking steel piling and heavily timbered. The dock walls are built of 7 to 1 concrete, and have an average width of 12 feet, with a height of 43 feet. Chains are placed in the foundation of the walls, 10 feet apart, to make connection with the invert, which was built later.

On completion of the side walls a Diesel navy excavated between the walls in short sections, which were at once concreted. In this manner the invert was constructed. It consists of 6 to 1 concrete, and is 9 feet thick along the centre line and 7 feet thick at the sides.

The excavated earth was taken to fill up the basin where the two floating docks used to lie.

Along the west boundary of this basin a concrete conduit was built, into which was led the Stotts Burn, which formerly discharged into the floating docks basin, and which now drains into the main stream of the River Tyne. A timbered quay is constructed along the river frontage of this reclaimed land.

While the bow end of the new graving dock was being made the cofferdam to enclose the river-side end was completed, and the construction of the entrance walls and sill was begun. In this part of the work some delay was occasioned by the difficulties encountered in establishing the foundation, but after some delay the contractors eventually achieved their object. This part of the work was divided into small sections, each of which was entirely enclosed within steel piling, the greater part of which has not been drawn but left in place after being burnt off by means of an oxy-acetylene flame to the required level.

The pump house, with a suction chamber underneath, lies between the east wall of the new dock and the west of No. 1 dock near the entrance. In the construction of it the concrete has been reinforced with steel rails and bars.

The pumping machinery has been supplied by Messrs. Drysdale & Co., of Bon Accord Works, Yoker, Glasgow. There are two electrically-driven centrifugal pumps, of a total capacity of 70,000 gallons per minute, capable of emptying the dock in two hours with no ship in the dock.

The sill of the dock is of concrete, 18 feet deep, and it is topped with finely dressed granite to receive the greenheart clapping sill of the gates. These entrance gates are of steel of double-leaf type, and were built by Swan, Hunter & Wigham Richardson at their Wallsend Shipyard. Each leaf weighs about 90 tons, and they were lifted and placed in position by a floating crane.

At the entrance of the dock the hollow quoins are made of granite, very finely dressed to fit the greenheart heel-posts of the gates.

At each side of the dock entrance on the walls is an electric capstan for warping ships into dock, and also for opening and shutting the dock gates.

During the construction of the dock some 50,000 tons of concrete were used. On the riverside timber quay two huge concrete mixers were erected, to which material was brought either by barges or by rail. The material was fed into a large hopper above filled by means of a crane erected for the purpose. The concrete, as soon as it was mixed, was discharged into trucks, which were then taken by Diesel locomotives to the place required, and the contents poured down the shoots.

The total quantity of material excavated for the dock was 175,000 tons, of which 65,000 was from the timbered trenches, in which the walls were built, and the remainder was removed in open cut.

Port of London Authority

London's Shipping.

During the week ended October 26th, 1,378 vessels, representing 1,084,992 net register tons, used the Port of London. 535 vessels (848,819 net register tons) were to and from Empire and Foreign Ports, and 843 vessels (236,173 net register tons) were engaged in coastwise traffic.

Twenty-two timber-laden vessels docked with 33,558 tons of soft wood.

* * * *

During the week ended November 2nd, 903 vessels, representing 900,151 net register tons, used the Port of London. 495 vessels (734,187 net register tons) were to and from Empire and Foreign Ports, and 408 vessels (165,964 net register tons) were engaged in coastwise traffic.

Twenty-one timber-laden vessels docked with 36,035 tons of soft wood.

* * * *

During the week ended November 9th, 1,197 vessels, representing 923,873 net register tons, used the Port of London. 686 vessels (712,344 net register tons) were to and from Empire and Foreign Ports, and 711 vessels (211,529 net register tons) were engaged in coastwise traffic.

Twenty-eight timber-laden vessels docked with 40,668 tons of soft wood.

* * * *

During the week ended November 16th, 1,043 vessels, representing 1,073,520 net register tons, used the Port of London. 505 vessels (846,531 net register tons) were to and from

Empire and Foreign Ports, and 538 vessels (226,989 net register tons) were engaged in coastwise traffic.

Twenty-three timber-laden vessels docked with 33,544 tons of soft wood.

* * * *

During the week ended November 23rd, 958 vessels, representing 885,779 net register tons, used the Port of London. 457 vessels (709,798 net register tons) were to and from Empire and Foreign Ports and 501 vessels (175,981 net register tons) were engaged in coastwise traffic.

Twenty-one timber-laden vessels docked with 26,171 tons of softwood.

Tilbury Passenger Landing Stage.

During the month of October, thirty-four vessels, totalling 291,564 gross register tons, used the P.L.A. Tilbury Passenger Landing Stage.

Workington Dock Record.

Prince of Wales Dock, Workington, has recently experienced a record week. Cargoes totalling 23,210 tons were dealt with, a figure higher than that for any other seven days in the year. Most of the tonnage was on the import account, three more boats having berthed during the week, but there was also a welcome improvement in the coal shipments, which for the first time since the beginning of June exceeded 4,000 tons. The total of the eleven cargoes despatched to Ireland was 4,380 tons, compared with 3,290 tons the previous week and 4,312 tons in the corresponding period a year ago. Iron and steel goods also were exported.

The Port of Dublin

Review by Chairman of Dublin Port and Docks Board.

MR. T. F. LAURIE, Chairman of the Dublin Port and Docks Board, in the course of an address on "The Port of Dublin," read before the Dublin Rotary Club, said that the historical associations of the Port went back to the distant past. Ptolemy recorded, about 150 years before the Christian era, the existence of the City of Eblana, the name by which Dublin was then known.

The Norsemen and the Danes, he believed, began the making of dock and harbour accommodation and built the first bridge at Dublin. Thereafter came the Norman invaders, whose descendants opened up trade with Bristol and other cross-Channel ports.

Where Westmoreland Street and D'Oher Street now stand was tidal water, and it was on record that a ship was wrecked during a great storm at a site approximately where Merrion Row now stands. For many years the accommodation provided for shipping was meagre. In 1590 the depth of the Liffey at the point now known as Merchants' Quay and Wood Quay, varied from three to six feet.

The Ballast Office.

The creation of the progressive seaport as it existed to-day might be said to date from the early years of the 18th century. In 1707 the Corporation of Dublin was empowered to erect a "Ballast Office," which should have charge of the dredging of the Liffey. The City Fathers were conservators of the Port until 1786, when its care and management were transferred to a body entitled "The Corporation for Preserving and Improving the Port of Dublin." Only sailing vessels traded with the Port in those days, and as the export trade was small, they rarely got a cargo from Dublin. They were obliged to take on board ballast, supplied by the Corporation, and the Corporation came to be known as "The Ballast Board." The Port remained vested in this body until it was transferred to the Dublin Port and Docks Board, as at present constituted, by the Dublin Port Act of 1867.

It is interesting to compare monetary expenditure over the period of 148 years under the auspices of the Ballast Board and the Dublin Port and Docks Board on the improvement of the Port:—

From 1786 to 1868 (83 years) ...	£193,000.
From 1869 to 1933 (65 years) ...	£2,190,000.

When the Dublin Port and Docks Board took over, vessels of any draught were obliged to anchor in the Bay and to discharge a portion of their cargo into lighters before it was possible to enter the river. Since then, millions of tons of material have been dug out or dredged. The sum of over £2,000,000 has been expended in deepening the bar, river channel and berths, and in providing equipment and facilities for the rapid loading and discharge of vessels. Indeed, the modern Port of Dublin has been changed out of all recognition.

Rapid Progress.

The rapid development of the Port, with the resultant heavy expenditure of money, said Mr. Laurie, was brought about, in the first instance, by the change over from sail to steam, and then by the ever-increasing size of the vessels using the Port, which necessitated deeper water and better berthage. To-day vessels drawing up to 27 feet of water can steam up to the Alexandra Basin where deep-water berthage is provided, and be afloat at all stages of the tide. A straight and wide channel marked out by international day marks, and liberally lighted with buoys for navigation by night, has created right into the heart of the city, a channel which is wide, deep and safe, with an entrance 1,000 feet wide.

The navigation of the Bay and river channel is the care of the Board, who have provided for the compulsory pilot service, two pilot steamers, and an experienced staff of pilots. The Board also has in commission two powerful tugs available for public towage.

Some of the details of the larger items of expenditure during the past 65 years of the present Board's stewardship are as follow:—

Dredging river channel and bar, and reclama- tion of land	£637,000
Building and reconstructing the Quay	£636,000
North Quay extension and Alexandra Basin	£408,000
Sheds, Stores and Warehouses	£125,000
Cranes, Tramways and Plant	£77,000

Overseas Trade.

For the extensive and rapidly-growing overseas trade, berthage and shed accommodation are provided at the North Wall Extension and the Alexandra Basin. At the Alexandra Basin, the ample berthage can accommodate the largest vessel which passes through the Suez or Panama Canals. From these deep-water berths, bulk grain and oil cargoes are discharged by powerful suction plants direct from the ship into the warehouse or storage tank.

The cross-Channel and coastal trade is carried mainly by companies having regular steamship services, with extensive shed and berthage accommodation on the North and South Quays.

Facilities for Cargoes.

To ensure the rapid despatch of cargo, the Port Board has provided 23 (3 to 6 tons) electric cranes and one 100 tons crane, while the purchase of two additional cranes has been approved. In fact, during the past three years the number of cranes has been increased by over 25 per cent.

The present total quay frontage is well over three miles in length, and is well lighted.

Both the North Quay Extension and the Alexandra Wharf are in direct communication with the entire railway system of Ireland.

The Dublin Quays are also directly linked up with the inland navigation of Ireland. The North Quays from the Royal Canal Dock and Spencer Dock via Royal Canal which connects up with Tarmonbarry on the Shannon, and a branch canal to Longford. The South Quays are connected with the Shannon and Barrow by the Grand Canal, the eastern terminal point of which is the extensive Grand Canal Docks in the Port of Dublin. The Canal, the longest waterway system in the British Isles, connects three important postal cities—Dublin, Limerick and Waterford, and towns scattered over 16 of the counties of Saorstát Éireann.

Warehouse Accommodation.

The Custom House Docks and Warehouses owned by the Dublin Port and Docks Board cover an area of 34 acres, and provide accommodation for 40,000 casks of wine and spirits, 22,000 tons of grain, 12,000 hogsheads of tobacco, 10,000 tons of general merchandise, and wharfage accommodation for 30,000 tons of coal.

Within the past few years two tobacco warehouses fitted with modern electric appliances for handling casks, have been erected at a cost of £40,000, and the Board have under contemplation at the moment, the provision of further warehouses for this commodity at a probable cost of £50,000.

Shipbuilding Work.

On both sides of the river, competent ship building and ship repairing firms have their yards, in which all classes of building and repair work are executed; there is also a graving dock and graving slips necessary for the repair of ships below the water line, a 6-ton electric crane has been installed at the Graving Dock, and the Dublin Graving Dock has now been brought abreast of all modern graving docks, and this equipment greatly facilitates the ship-repairing industry.

"The foregoing," said Mr. Laurie, "is a record of which any public body may well be proud, and the Dublin Port and Docks Board is not content to rest upon its laurels. I think I can say, without fear of contradiction, that to-day the Port of Dublin is a first-class Port, equipped with modern facilities for rapid loading and discharge of cargoes, and will compare favourably with any other first-class port in the world.

"The Board have Authorised:

"An extension of another section, 100 feet in length, of deep water at Alexandra Quay.

"The completion of the North Quay Extension by the provision of 800 feet of additional berthage.

"The widening of the entrance to Alexandra Basin.

"The buoyage in the navigable channel has been changed to accord with the International system as proposed by the League of Nations. Dublin was, I believe, the first Port to adopt the system, which will become a Port which is catering for shipping of all nationalities.

"The navigable channel is being well looked after, the Board having recently purchased and installed an Echo Sounder, a marvellous instrument, which makes practically a continuous record of the depth of water under the small launch which carries the instrument. Records being obtained at every two feet of distance when the launch is travelling at three knots per hour, and sounding can be carried out in almost any weather conditions.

The Port of Dublin—continued

"The Custom House Docks Warehousing Department is under review with intent to modernisation and equipment with labour-aiding devices and the probable demolition of obsolete buildings and the erection of modern storage.

City Interests.

"The expansion of the City proceeds apace and brings with it its own problems, one of which is "across the river facilities." The Board, as the Bridge authority as far inland as Kingsbridge, is naturally keenly interested. The proposal to extend Georges Street to the Liffey and to open up a new street on the North side of the river, with its necessary bridge, is a matter of distinct interest, and I have no doubt that the Board will do its duty in an equally efficient manner as with Butt Bridge.

"The interests of the City in another respect have not been overlooked, as the Board have provided a 60-acre site for the Corporation to dump refuse. This site in the fulness of time will be available for the location of factories.

"Every facility has recently been afforded to the Dublin Corporation for the development of the Bull Wall and the improvements which have taken place there have given enjoyment to thousands of citizens.

"The work of the Board is exemplified in the wonderful spectacle afforded to the citizens by the shipping in the Port of Dublin during the occasion of the recent Eucharistic Congress, and it is a matter for proud boast that all that concentration of tonnage was achieved without a single mishap and without the loss of even a rope. A remarkable tribute to the Port and the efficiency of the personnel of the Port."

When replying to a vote of thanks, Mr. Laurie referred to the limitation of the Board's powers under the Charter from which they have their authority, and indicated that the Board's Accounts are subject to Local Government Board Audit. He also made special reference to the services rendered gratuitously by the Members of the Board and the great amount of time and attention given by the Members in connection with the work of the Board.

Hull and the East Coast

Traffic at the Humber Ports.

WORK at the docks at Hull and the sister ports of the Humber continues on steady lines, and while the shipment of coal is maintained at slightly above last year's level there is no indication at present of a return to the normal or the volume shipped prior to the operation of the Coal Mines Act. There is, however, some hope of an improvement in the New Year when the new arrangement of separate quotas of production for the purposes of the foreign trade and bunkering and for home consumption will be inaugurated. The real difficulty is, of course, the numerous import restrictions and currency regulations of several Continental countries which are usually considerable buyers of coal shipped from the Humber. France and Germany, for example, in normal conditions, each took over a million tons per annum from the Humber ports, but in the last two years the quantity exported thither has fallen to less than half a million tons to each country. Holland and Belgium have also imported much reduced quantities, as has also Italy. For the ten months to the end of October the exports (foreign) from the Humber were 2,741,574 tons, or 21,388 tons more than in the corresponding period of last year; and from Boston and Lynn 239,659 tons, or 26,700 tons less. The shipment of coal as bunkers on ocean-going ships has been maintained at the level of rather more than a quarter of a million tons per month, which with the exported coal has kept the appliances at the docks in fair use, though only at about half normal capacity.

Revival of Project for Bridge Across the Humber at Hull.

In view of the statement of the Minister of Transport that he would be prepared to give consideration to schemes on the lines of the Mersey tunnel, hopes are entertained of the revival of the project of a road bridge across the Humber between Hull and North Lincolnshire. When this scheme was put forward by the Hull Corporation three or four years ago, the Government promised to make a very substantial contribution towards the cost of a bridge, but the offer was later withdrawn in consequence of the urgency of national economy. Subsequently proposals were made to finance the project in another way, but the Bill failed to secure approval at Westminster and was withdrawn. The recent Municipal elections at Hull have given the Labour Party a good working majority on the City Council, and it is thought that in order to provide employment on a large scale, and at the same time to push forward a much-needed improved means of communication between Yorkshire and Lincolnshire, the time may now be favourable for again putting the bridge scheme into practical shape. The estimated total cost is £1,750,000.

Bridlington Harbour Commissioners Purchase a Dredger.

Negotiations with the Scarborough and Whitby Boards of Harbour Commissioners not having made satisfactory progress the Bridlington (East Yorkshire) Harbour Commissioners have taken independent action in the matter of dredging, and have purchased a screw grab hopper dredger from Portsmouth owners. At the October meeting of the Commissioners the action of the Works Committee was confirmed, and an agreement with Barclay's Bank authorised to borrow the full amount of the cost at five per cent. per annum, to be repaid in seven years. The Commissioners had contemplated the construction of a new landing stage, but this has been temporarily abandoned in view of the urgent necessity for dredging the

harbour. A deputation visited London and waited upon two Government departments and the Development Commissioners with whom they discussed the matter and applied for financial assistance. Application for support has also been made to the East Riding County Council, the Bridlington Corporation and the Royal Yorkshire Yacht Club. The Commissioners are hopeful that the various departments and authorities will respond generously and thus enable them to commence work almost immediately upon the removal of 80,000 to 100,000 tons of mud which has been carried into the Bridlington Harbour in recent years. During the past ten years the silting in the harbour has increased by an additional six feet in depth, and with the dredger operating on 250 working days of the year it is estimated that 75,000 tons can be removed within twelve months. With Councillor Dunkerley's assistance, the Clerk (Mr. Hankinson) has prepared a report in which he states that, assuming sufficient funds are forthcoming to work the dredger for 250 days in the year, the expenditure for that time would be £1,270, based on the dredger making two trips per day, one with each tide. The capacity of the dredger is 150 tons, thus making a daily total of mud lifted of 300 tons. The question of the dredging of the harbours at Scarborough and Whitby is still unsettled, but if the authorities at these ports do not wish to buy a dredger on their own account, it is understood that they will be able to borrow or hire that now owned by the Bridlington Commissioners and thus be able to carry out, at a minimum of expense, very urgently needed work and hereafter maintain constantly a certain depth of water.

Bombay Port Trust

Revenue Earnings for First Half-year, 1934-35

At a meeting of the Trustees of the Port of Bombay, held on 23rd October, 1934, a report on the revenue for the half-year ended 30th September, 1934, was considered. The receipts for the half-year amounted to Rs. 120.42 lakhs, which is Rs. 1.28 lakhs less than the receipts for the corresponding period of the previous year. The decrease is more than accounted for by the reductions in wharfage and other charges on raw cotton sanctioned from 1st April, 1934, and the percentage rebates in ground and storage rents.

An expenditure of Rs. 23,680 was sanctioned, subject to the necessary sanction of Government, for altering the design of two 300-ton special type hopper barges so as to make them suitable for use in connection with the dredging of the Port Trust bunders and basins.

In reply to a request from the Agent, B. B. & C. I. Railway, for the opinion of the Port Trust on the financial justification for the projected Bombay-Sind Broad Gauge Railway, the Trustees expressed the view that the project, which is estimated to cost six crores of rupees, could not be justified on financial grounds, seeing that a considerable portion of the proposed line would run through barren and unpopulated districts, and that railway experts who had investigated the scheme regarded it as improbable that the net return would exceed 2 per cent. The Trustees further remarked that, in their opinion, the existing coastal shipping services provide ample carrying capacity for the traffic between Bombay and Karachi and the intervening ports, and should normally be able to carry it at lower rates than the all-rail route could profitably quote.

Notes from Far Eastern Ports

Ceylon

More Ships call at Colombo.

MORE ships called at the Port of Colombo last September than in the corresponding month of 1933 and 1932. In September last there were 213 ships with a tonnage of 970,473, compared with 187, tonnage 859,874, in 1933, and 193, tonnage 870,986 in 1932.

A comparison of the total callers in the nine months of the last three years shows the improvement the harbour has experienced in 1934. The figures are:—

		No.	Tons
1934	...	1,965	8,975,436
1933	...	1,851	8,416,388
1932	...	1,954	8,647,584

In September, 1934, as many as 216 vessels were cleared, compared with 189 in 1933 and 192 in 1932. The number of ships cleared in the nine months of 1934 was 1,979, an increase of 113, compared with the number cleared in 1933 and 30 compared with the figure for 1932.

Oil Dock and Deep Water Quay for Colombo.

A certain amount of survey work, in connection with the proposed Oil Dock and Deep Water Quay, is now being put in hand by the Colombo Harbour Engineer, Mr. T. A. Owles. The advice of the consulting engineers is also being sought by the local authorities in regard to the scheme, which, when completed, should add considerably towards making Colombo still more efficient.

The State Council, it will be recalled, recently sanctioned the vote of Rs. 10,000 asked for by the harbour engineer for the purpose of preparing estimates and plans of the Oil Dock and Deep Water Quay.

Colombo's Foreign Trade.

An indication of the better trade conditions ruling in Ceylon at present is provided by the latest Port Commission statistics in the matter of the volume of goods traffic which used the Lake to Harbour Canal in the first nine months of this year.

The import cargo handled in the period amounted to 17,833 tons, against 9,013 tons in the corresponding period of 1933. In point of fact the total volume of goods which passed through the land in the whole of 1933 was less by about 6,300 tons than that for the nine completed months of 1934.

In the matter of the export goods traffic which passed through the canal, the quantity handled in the nine months of 1934 was in excess of that of the corresponding period of 1933 by about 3,000 tons.

Colombo as Coal-bunkering Port.

Is Colombo as a coal-bunkering port tending to lose its position in the Eastern shipping world?

Statistics prepared by the Colombo Port Commission seem to suggest that this is so.

The question has been engaging the attention of those closely associated with the port affairs and it seems most probable that charges will be reduced before long in order to meet the competition of other ports.

While it is true that in September a larger number of vessels were coaled here than during the previous month or the same month last year, yet the total number of ships bunkered in the nine months of 1934 was less than in the corresponding period of 1933. Up to the end of September last, 597 ships used Colombo for coaling purposes, while for the same period last year 614 vessels called here to bunker.

As a result of several ships filling up with larger quantities than is usual, the total volume of bunker coal used this year was slightly in excess of that of 1933. Coal bunkers supplied to steamers at Colombo during 1933 and January to September, 1934, were as follows:—

		1933		1934	
	No.	Tons	No.	Tons	
January	76	21,376	66	19,248	
February	55	13,253	62	14,445	
March	69	19,878	79	20,424	
April	69	19,473	67	18,785	
May	76	23,430	55	19,248	
June	82	23,720	69	18,268	
July	80	20,118	69	19,725	
August	59	16,476	63	21,818	
September	48	12,057	67	18,237	
Total	614	169,841	597	170,198	
October	56	16,379			
November	56	15,084			
December	55	16,482			
Annually	781	217,786			

Coal Imports Down.

As may be expected in the conditions which rule in the local coal bunkering business, the imports of the commodity during the nine months of 1934 were less than in the same period of 1933, the difference being about 20,000 tons. In October, however, the largest quantity of coal received in any one month of 1934 was handled, the amount being 51,866 tons, or about 10,000 tons more than the next highest, 41,625 tons registered in January.

The coal imports of the previous year and the nine months of the present year are as follows:—

		1933	1934
		Tons	Tons
January	...	48,356	41,625
February	...	20,213	19,435
March	...	44,932	32,287
April	...	15,121	30,829
May	...	39,739	37,116
June	...	45,595	25,286
July	...	32,487	38,538
August	...	32,692	36,989
September	...	52,198	51,866
Total		331,343	312,971
October	...	30,105	
November	...	37,201	
December	...	6,268	
Annually		404,917	

Colombo Port Revenue.

Colombo Port revenue in the month of October this year amounted to Rs. 444,979.68, while for the ten months of the year the total collection reached Rs. 4,115,199.79, an increase of nearly Rs. 390,000 over that of 1933.

India

Difficulties at Nagapatam Port.

The difficulties experienced in Nagapatam, South India, by merchants connected with that port are shortly to be pointed out to the Inspector of Customs by a deputation from the Nagapatam Chamber of Commerce.

Assessments and clearances of cargo imported into or exported from this port are to form the chief subjects of the deputation's representations. The Nagapatam Chamber has also resolved to approach the British India S.N. Co., for a reduction of their passenger fares between Nagapatam and Malaya, and for the provision of more adequate accommodation for use by passengers proceeding to Malaya.

Cochin Harbour.

Cochin State will enter a new era of development and prosperity with the completion of the scheme of the Shoranur-Cochin Railway Conversion which is chiefly intended to deal with the increased traffic caused by the opening of the Cochin Harbour.

The line was opened to traffic by H.H. the Maharajah of Cochin at Ernakulam on October 24th. Constructed at a cost of Rs. 80 lakhs, the line will serve as the main link between Cochin Harbour and the rest of the country.

With the growing traffic in the magnificent Cochin Harbour and a railway directly linked to the whole of the broad gauge system of India, Cochin is looking ahead to a period of great industrial and business activity. The construction, which was heavy and difficult, had to be carried out without interruption to the present metre gauge traffic. As there is a possibility of the construction of a metre gauge line between Kollengode and Trichur being taken up later, a third rail is required between Trichur and Cochin to admit of the metre gauge stock being cleared and taken direct to the harbour.

Timber Congestion at Hull now Overcome.

The congestion at the Victoria Dock, Hull, which has prevailed during practically the whole of the timber importing season has now been overcome. During the peak period there was considerable pressure, due to a large extent to the numerous Russian cargoes growing unexpectedly to schedule, no fewer than 98 vessels laden with timber from Russian ports in Northern Europe have come to hand at Hull in addition to the many from Sweden, Finland and other Baltic countries. The imports, hewn and sawn, at the beginning of November exceeded 900,000 loads, and are now well on the way to the million loads. Imports of wheat and kindred cereals at Hull for the ten months are 1,063,320 tons, which shows a decrease of 110,685 tons, as compared with the same period last year. This loss is, however, compensated to some extent by an increase of 67,500 tons in the imports of oilseeds, etc., which (including oilcake) give a total of 520,050 tons. The docks devoted to the near Continental trades have not been so busy owing to the dislocation of German business and other causes.

cal
ng
of
er,
th
ut
ed
is

r
e
r

PORT OF BARI.

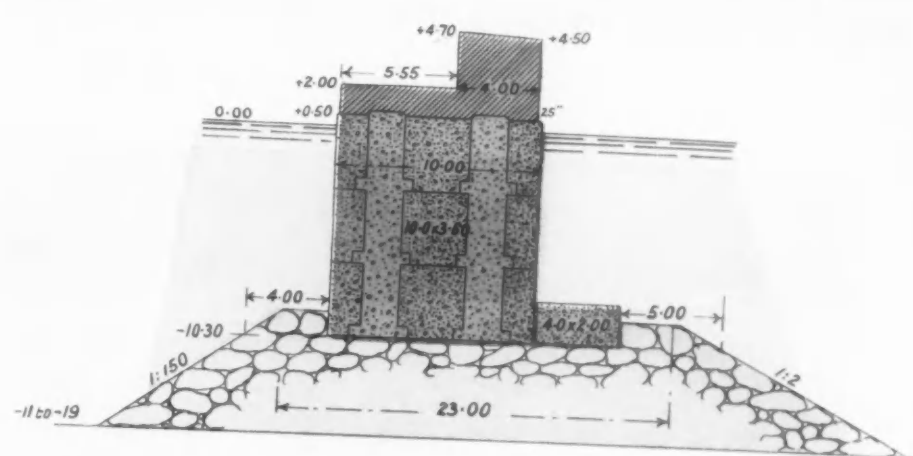
(I T A L Y)



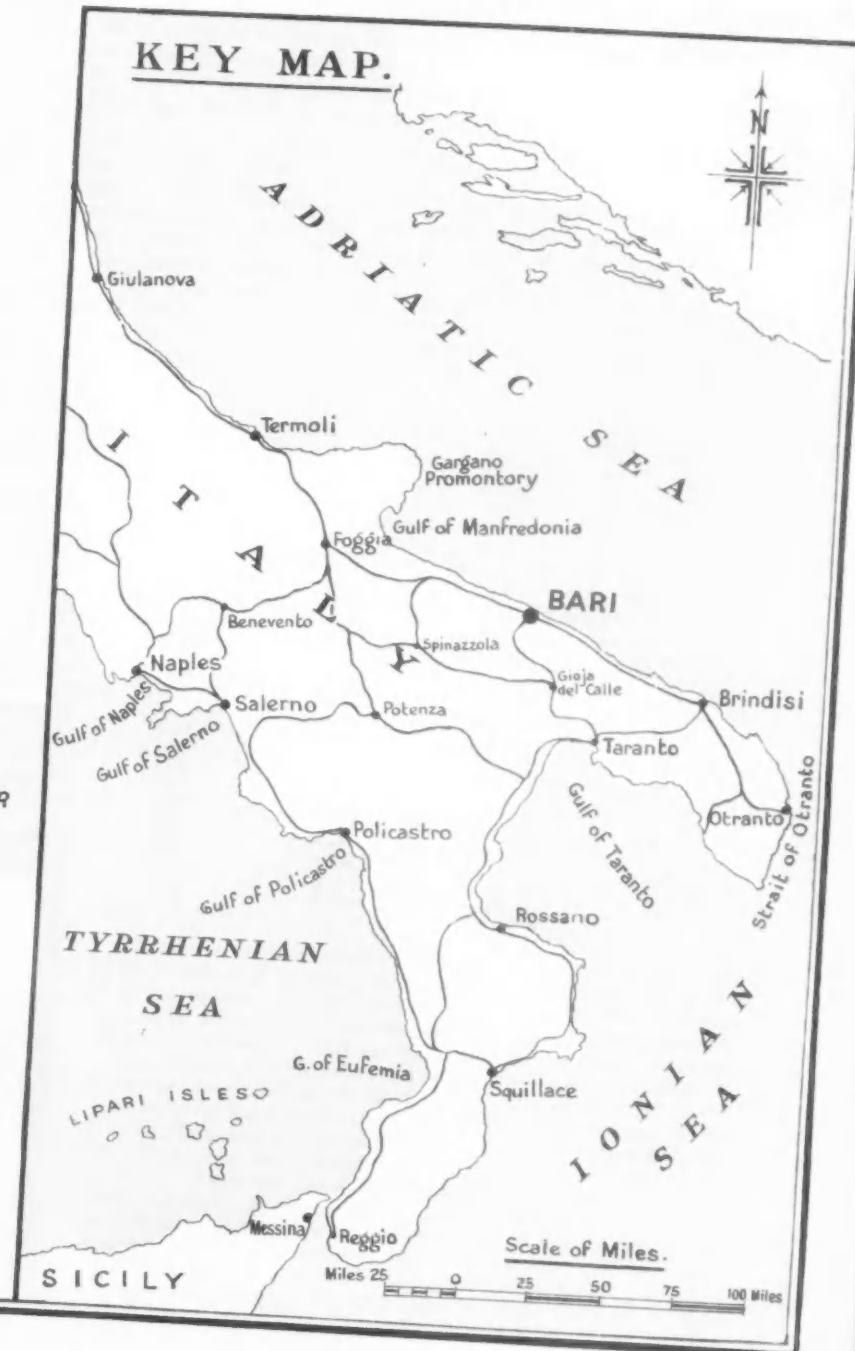
NOTE; Works in course of construction are coloured RED.

Scale for Plan.





CROSS SECTION OF OUTER BREAKWATER.



The Port of Bari: The Gateway to the Levant and the East

By ANTONIO GIORDANO



General View of the New Port.

TRACES of the existence of a port at Bari may be found in Greek history, but actually the existence of real harbour facilities at Bari only dates back as far as the period 1815-1860, when efforts were made to provide the Port of Bari with breakwaters and so shelter the water area in front of the town. However, in 1860, when the Italian Government replaced the Borbonic Government, the original project was revised, and the existing breakwater was extended by 200 metres in the same direction, while a second section was built towards the San Cataldo point, this section having a length of 450 metres. These works were commenced in 1872 and were terminated in 1883. At the same time a powerful lighthouse, having a radius of 22 miles, was built on the San Cataldo point. Subsequently, between 1884 and 1905 the Port of Bari was completed with the necessary auxiliary works, which were as follows:—

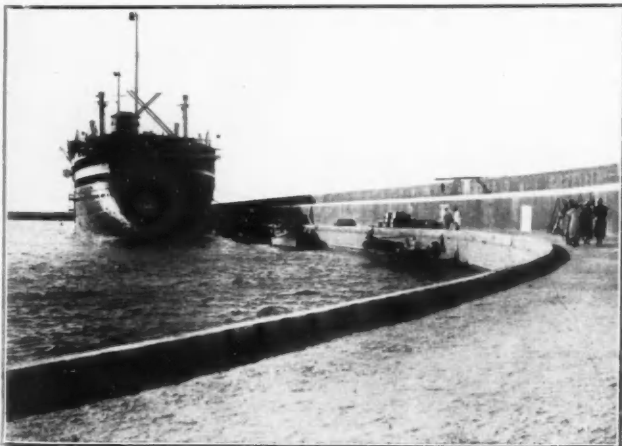
(a) The outer breakwater directed towards the North-East with an interior quay, measuring 760 metres in length and 15 metres in width, where ships could also anchor stern to quay with a depth of water of 5 to 8 metres.

(b) The Central Custom's House quay, measuring 250 metres in length with a depth of 4 metres.

(c) The Sanità Pier, measuring 180 metres in length and 18 metres in width.

(d) The Pizzoli breakwater, consisting of rocks and measuring 560 metres in length with a depth of water of 6 metres.

The total length of quays in the Port of Bari in 1905 amounted to 1,220 metres, of which only 250 metres could be used by large-size ships. It should be noted that during the period between 1894 and 1904 the net register tonnage of ships calling at Bari increased from 796,000 tons in 1894 to 2,069,960 tons in 1904, which fact clearly confirmed the necessity for enlarging the then existing harbour facilities. As a matter of fact, in 1907, a commencement was made upon the construction of the following works:—



View of the completed Breakwater with the Motor Vessel "Oceania" alongside.

(a) The construction of quay walls along the Pizzoli breakwater, so that a new quay of 400 metres in length and 12 metres in width has been obtained with a depth of water varying between 3 and 6 metres.

(b) Dredging alongside the outer breakwater, thus increasing the depth of water to 8.50 metres.

(c) The connection of the port with the central railway station of Bari.

The geographical position of the Port of Bari (see Supplement) is such that it represents the speediest connection between Italy and the Balkan peninsula, the Levant and the Eastern Mediterranean as well as the Far East. Also in regard to the connections between Italy and the Mediterranean Italian Colonies Bari offers some advantage over other ports. As a matter of fact, the following schedule shows the advantageous position of Bari:—

From	To Alexandria Miles	To Istanbul Miles	To Bengasi Miles	To Durazzo Miles
Bari ...	896	850	599	118
Venice ...	1,217	1,171	913	407
Naples ...	1,008	986	603	—

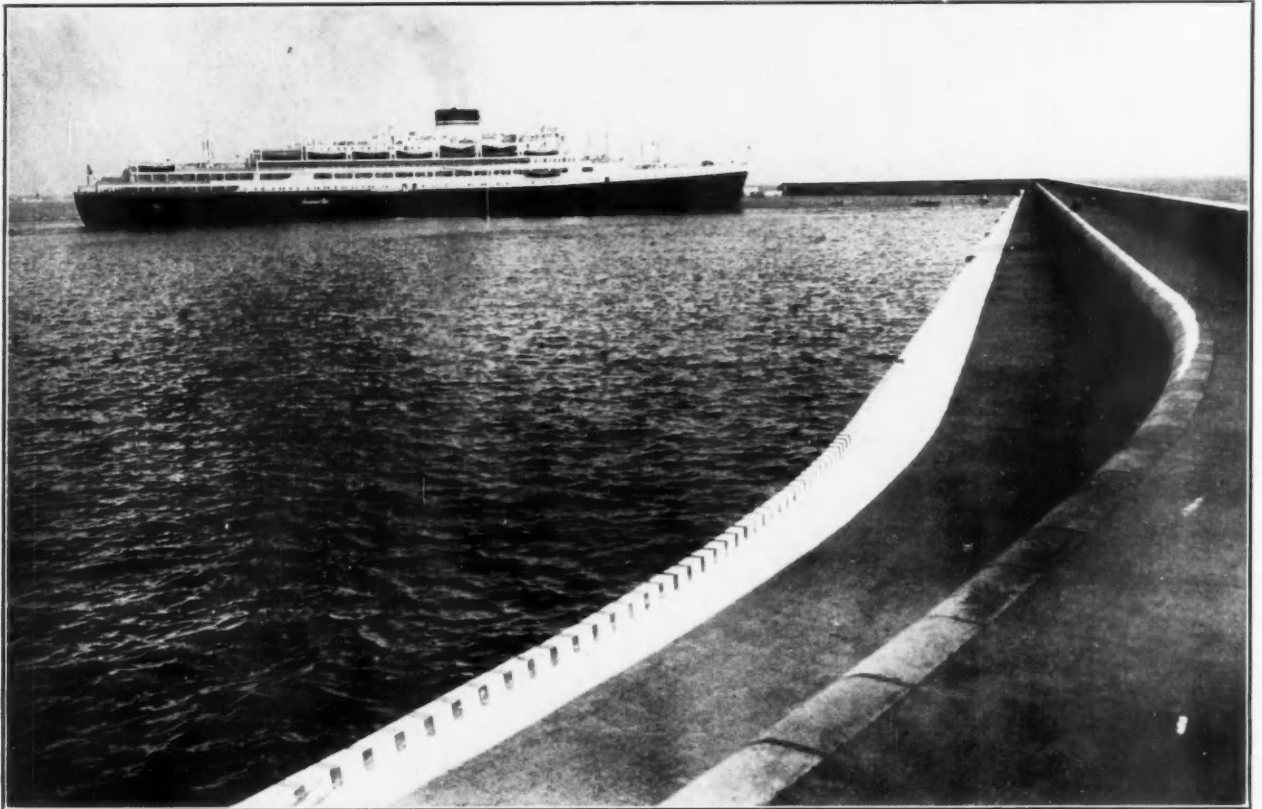
It is no wonder, therefore, that in the course of the past thirty years imports and exports at Bari have increased from year to year, as is shown by the following figures:—

	Ships Arrived and Cleared	N.R.T.	Goods Unloaded and Loaded
1894 ...	1,344	796,000	147,000
1904 ...	3,328	2,069,960	238,935
1914 ...	3,590	2,134,036	308,835
1924 ...	3,475	2,322,975	371,275
1925 ...	3,769	2,140,085	377,178
1926 ...	3,915	2,138,752	389,030
1927 ...	3,921	2,269,744	450,850
1928 ...	3,837	2,612,808	474,600
1929 ...	3,800	2,581,700	424,470
1930 ...	3,825	2,608,000	451,280
1931 ...	3,418	2,833,141	391,170
1932 ...	3,932	3,260,183	517,738
1933 ...	3,968	3,318,115	302,378

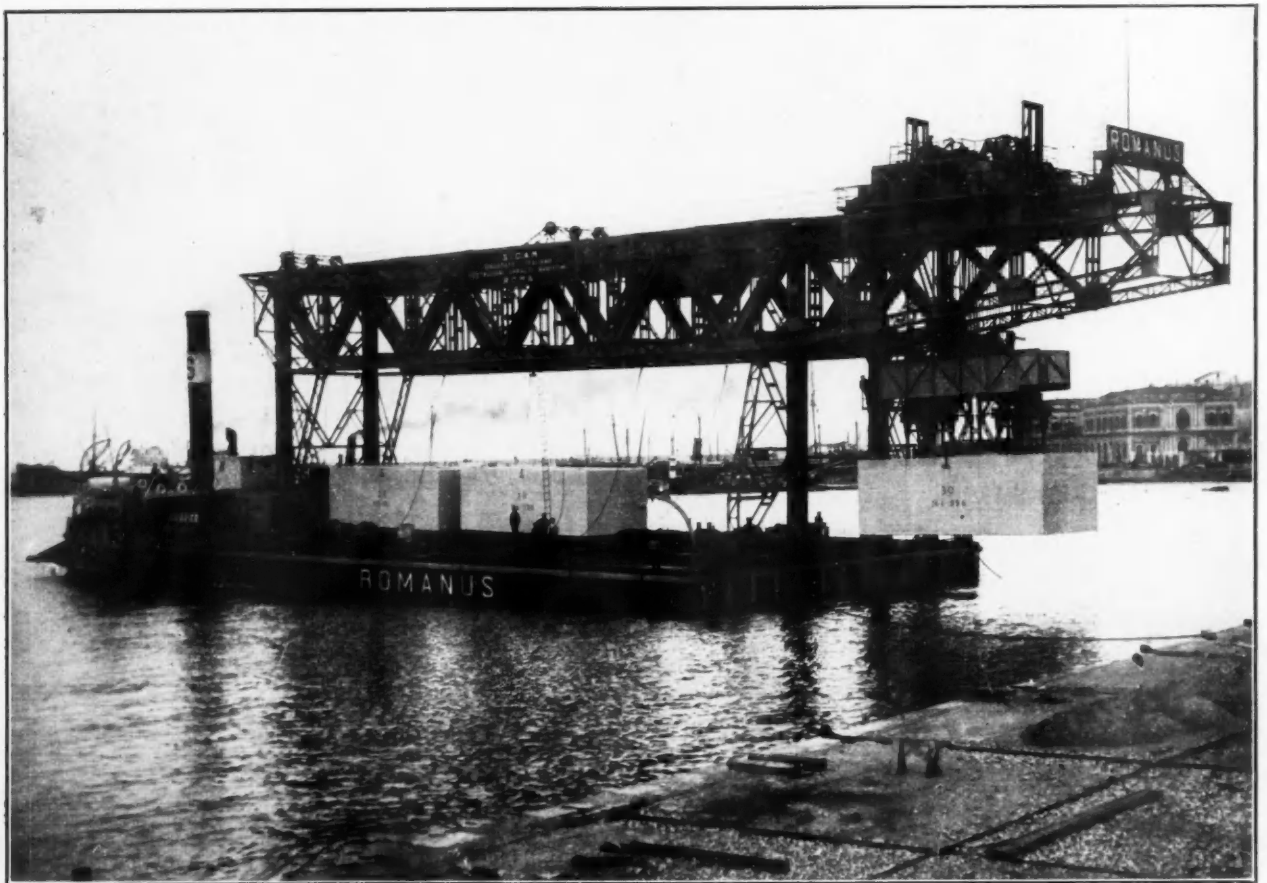
There has been a considerable decrease between 1932 and 1933 in shipping at Bari, but traffic has improved during the first few months of 1934, and it is only the imports of cereals that have shown a decline during 1933, this decrease amounting to 50,000 tons. This decline is due to the economic policy of the Italian Government and not to a decreased power of attraction to traffic on the part of the Port of Bari.

In judging the commercial and maritime importance of the Port of Bari, one cannot refrain from taking into consideration the influence of the Levant Samples Fair, which is held yearly at Bari. This fair adds considerably to the activity of the port, especially when one takes into account that the foreign participation to the Levant Samples Fair in Bari, during 1933, reached 30 per cent. of the total, whereas in 1930 it represented only 10 per cent., thus showing how foreign industrialists have realised the advantage of using the Port of Bari as an intermediate port for traffic between the West and the East.

The Port of Bari



View of the New Breakwater.



The Pontoon "Romanus" used for carrying and depositing Blocks for the Construction of the New Breakwater.

The Port of Bari—continued*Depositing Rock from Barges for the Foundation of the New Breakwater.*

Owing to the increasing tonnage of goods unloaded and loaded and the increasing tonnage of ships calling at Bari, together with the satisfactory prospects of future developments immediately after the Great War it was found necessary to again consider the question of enlargements at the port. A project to increase the quayage in the Port of Bari was prepared, and this involved an expense of 95,600,000 lire, of which 81,125,000 lire was needed for breakwaters and quays, and 11,475,000 lire for the construction of warehouses, electric cranes, etc. This scheme was not carried out, but during the period between 1923 and 1930 the Government provided a credit of 167,600,000 lire, of which 156,125,000 lire was to be utilised for the construction of breakwaters and quays and 11,475,000 lire for the construction of other facilities. These works will be completed in 1937, and are now well forward. They include:—

(a) The construction of a blockyard for the construction of concrete blocks, and having an area of 20,000 square metres with a quay measuring 200 metres in length and a depth of water of 3 metres. The transport of the clay is made by a small reduced gauge (95 centimetres) railway, connecting the blockyard with the mine situated at 6 kilometres from the town.

(b) The construction of a new breakwater to shelter the dock in the new port and running parallel to the old breakwater from which it is distant about 750 metres, and having a total length of 1,850 metres in four sections, of which over 1,500 metres have a depth varying from 10 to 18 metres. This breakwater has been built with concrete blocks having a weight of 350/380 tons each, there being three blocks one over the other, placed over a bed of rocks reaching a height of 10.30 metres under sea level (see Supplement). Each block has the following dimensions: 10 metres by 5 metres by 3.60 metres, and is

placed so that the width of the breakwater itself consists of a single block (10 metres). The use of such heavy blocks has rendered necessary the employment of a special pontoon having a hoisting capacity of 400 tons. This pontoon can carry three blocks at each time.

(c) The construction of a mole to shelter the new dock from the east, and having a length of 370 metres and a width of 9.90 metres.

(d) The construction of a breakwater commencing from the San Cataldo point towards North-East over a length of 400 metres.

(e) The construction of two piers and the respective quay between them. These piers will have a depth of water of over 10 metres, one being 110 metres in length and the other 72 metres.

With these piers the new port will have a total quayage of 1,160 metres which, in addition to the 1,200 metres of quayage in the old port, makes a total of 2,360 metres, and which is considered as sufficient to meet the present requirements of shipping. It should be noted that the construction of the two piers will not be started until 1935.

(f) The enlargement of the quay corresponding to the second section of the old breakwater with the object of exploiting that zone of the port more and giving the new quay a depth of water of 8 metres, as at present the depth does not reach 6 metres.

The fact that the Port of Bari is connected with Durazzo by a daily steamship service, and that there is a project to connect the Port of Durazzo with the interior of the Balkan peninsula by railway has raised the question of the advantage of establishing regular direct services between the Balkans-Bari-Naples in order to speed up connections between the Balkans and the West of Europe.

*View showing Blocks used for Construction of the New Breakwater, with Pontoon for carrying and depositing Blocks in background.*

Interesting Features in the Design of an Ultra High Speed Flexible Coupling

By A. O. HELPS, A.M.I.Mech.E., M.I.Struct.E.

THE writer, in the course of his duties as Mechanical Engineer to a large Port Authority, recently experienced a very unusual form of power transmission trouble. The gear on which the trouble arose was the power unit on a pneumatic elevator comprising a turbo exhauster driven through an increase ratio double helical gear box by means of a 130 h.p. motor, the motor speed being 2,960 r.p.m. and the turbo exhauster geared to run at 8,500 r.p.m., the general lay-out of the unit being shown diagrammatically in Fig. 1.

The two couplings "A" and "B" were of the flexible type, that between the motor and gear box at "A" being the Standard pin and bush type flexible coupling.

The writer has had considerable experience with this particular type of flexible coupling in all sizes and powers, and running under various conditions, and he has found them to be very reliable and cheap in upkeep.

The coupling between the gear box and the turbo exhauster at "B" was of the steel sliding spline type, shown in Fig. 2. From the outset this coupling gave considerable trouble, requiring frequent renewal, a form of oxidation taking place on the splines together with rapid deterioration and pitting of both the male and female splines. After short periods of running the splines were continually seizing, necessitating the stripping down of the gear box and exhauster in order to dismantle the coupling and clean it thoroughly.

The makers were given particulars of the trouble experienced, and at first it was thought that unsuitable lubricating oil was the cause of the oxidation and pitting on the splines. A sample of lubricating oil was sent for analysis, and the makers of the coupling stated that the oil was suitable for its duty in every respect.

A confusing point was the evidence of rapid corrosion and pitting despite the fact that there was very little, if any, relative movement of the male and female splines, owing to the gear box shaft being located by the type of gears employed (viz., Double Helical) and the exhauster shaft being retained within fine limits by the turbo thrust bearing. The makers stated that the bearing pressure on the splines was well within their usual design figure, and also that they were at a loss to explain the reason for the trouble experienced.

The writer then put forward the possibility of the pitting being due to electrolytic action, and quoted a somewhat similar case in which pitting and oxidation had taken place on gear teeth, a full account of which was given in a discussion after a paper by Mr. Francis Hodgkinson read before the Institution of Mechanical Engineers, and published in the Institution's Proceedings No. 5, 1929, pages 891 and 892. In this case, extensive corrosion took place on the gear teeth with many different lubricants after short service, although there was no possibility of abrasive action taking place, the surfaces were also stained reddish brown and the lubricants, on analysis, had

increased in acidity and contained iron oxide. (This was also the case with the lubricant taken from the spline coupling.)

The reason given for the pitting in the Proceedings of the Institution of Mechanical Engineers was Electrolytic action,

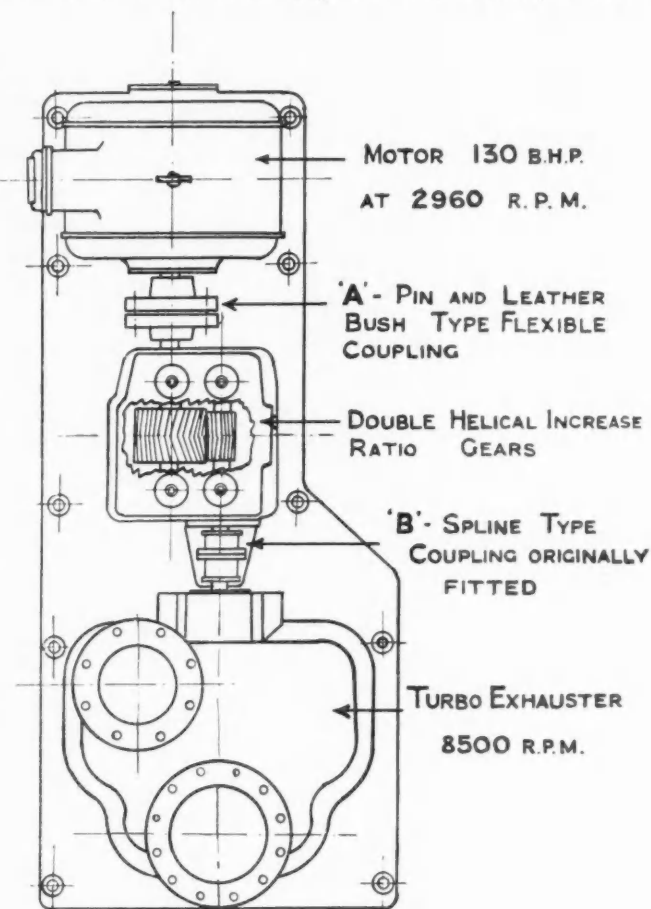


Fig. 1. Diagrammatic Sketch of Power Transmission

the Electrolyte being the lubricant, the Electric potential being provided by rapid variation of the local contact pressures of the gear parts.

It was thought that the symptoms in each case were very similar, and the makers agreed that very likely the explanation

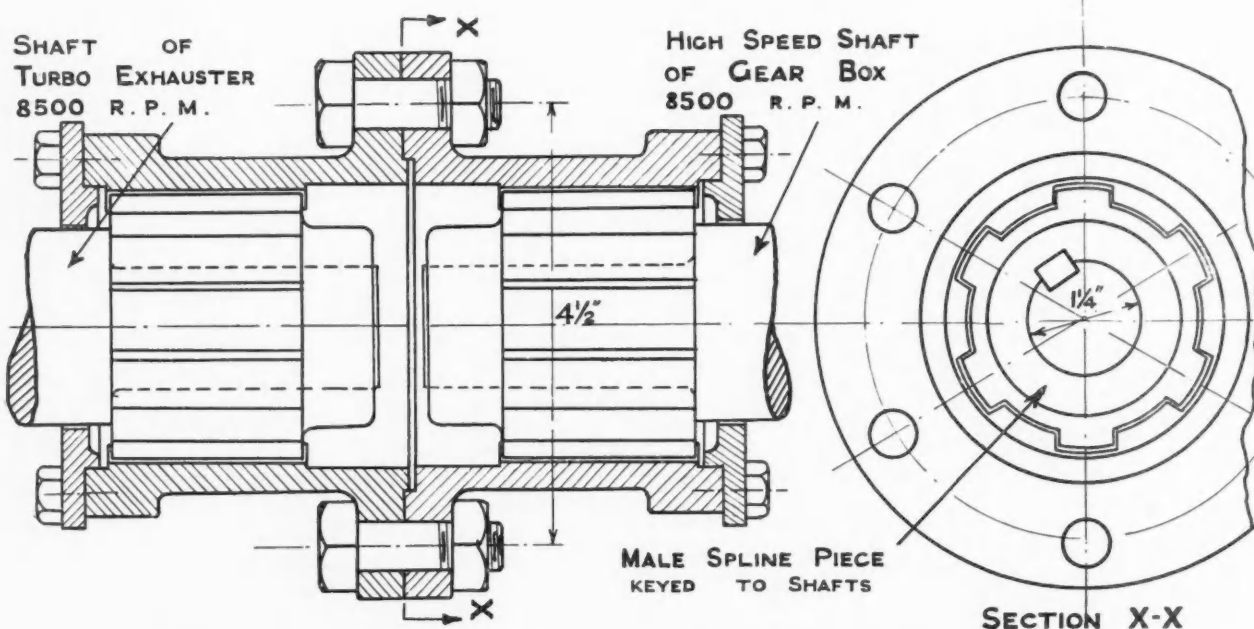


Fig. 2. Detail of Sliding Spline Flexible Coupling originally fitted at "B" in Fig. 1.

Design of an Ultra High Speed Flexible Coupling—continued

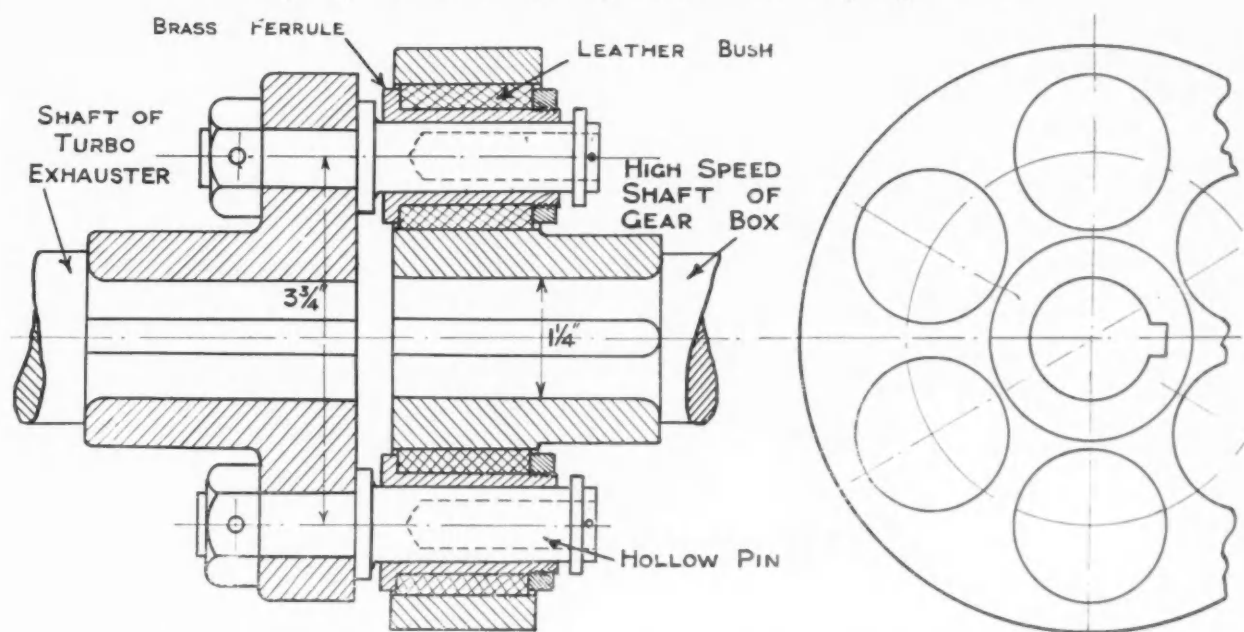


Fig. 3. Pin and Bush Type Flexible Coupling as finally fitted to High Speed Shaft.

of the trouble was electrolytic action due to variation of contact pressure on the splines, and the assumption was rather supported by the fact that it was only on the contact side of the splines that the pitting took place.

The makers then suggested trying a spline coupling made in stainless steel throughout. The life was increased, but still the oxidation and seizing of the splines occurred. The writer then decided to attempt to design a pin and bush type coupling to take the place of the spline coupling, although he had no knowledge of this type of coupling operating at such high b.h.p. and r.p.m., i.e., 130 b.h.p. at 8,500 r.p.m. The main difficulty to be surmounted was to accommodate this type of coupling within the limited space of the existing gear box extension, housing the small spline type coupling.

Both the makers of the turbo exhauster and the gears were asked if they considered a leather bush type coupling suitable for operation on the high-speed shaft, and the final decision was to be given by the makers of the gear box, who stated that they had no experience of a leather bush and pin type coupling operating at such high speed and under similar conditions, and further, that if it was employed it would have to be regarded as of an experimental nature.

The writer decided to proceed with the idea, made the necessary calculations and prepared the design of new type coupling to be used between the gear box and exhauster. A detail of this coupling is shown in Fig. 3. The coupling was made to this design, and since being fitted has given complete satisfaction; it is considered to have many advantages over the spline type originally fitted, viz. :—

(a) The initial cost per coupling was £5, against £10 for the spline coupling in ordinary steel, and £16 10s. for the spline coupling in stainless steel.

(b) It is far easier to align the turbo exhauster and gear box with the new type of coupling, and replacement is a far quicker job.

(c) No wear has as yet taken place on the leather bushes, and the plant has been in commission nine months, and should any wear take place it is confined to six leather bushes costing a few shillings to replace. The life of the spline coupling was nine months, after which complete renewal, costing many pounds, was necessary. In the new coupling replacement of the wearing parts is confined to small and inexpensive items, but it is doubtful if even the leather bushes will require renewing under three or four years.

In the actual design of the new coupling some very interesting points were brought out; particularly should it be noted that the stress on coupling pins from centrifugal force due to the dead weight of the pin, etc., is many times greater than the stress on the pins due to the motor torque, despite the fact that the b.h.p. transmitted is as high as 130 b.h.p. This fact is, of course, due to the high velocity of the coupling pins and the relatively heavy pin and ferrule containing the leather bush.

Calculations for the New Type of Proposed Coupling.

Maximum Duty to Transmit 130 b.h.p. at 8,500 r.p.m.

Assume the coupling pins have to take the load from centrifugal force without relying on any support from the floating leather bushes. This must be assumed, as it will be seen later that if one relies on the leather bushes supporting the pins against centrifugal force the bearing pressure per square inch

on the leather becomes excessive and the condition would not hold for any length of time.

Load on Coupling Pin from Centrifugal Force.

Weight of protruding portion of pin = .243 lbs.
Weight of ferrule and leather bush = .375 lbs.

Total weight on 1 pin to set up C.F. = .618 lbs.

Velocity of Coupling Pin.

Pitch circle of coupling bolts = 3 1/4-in. diameter, R.P.M. = 8,500
 $3.14 \times 3.14 \times 8500$

Therefore Velocity in feet per minute = $\frac{8350}{12}$ = 8350 f.p.m.

Velocity in feet per second = 139 feet per second.

Now Centrifugal Force in pounds acting on one pin = $\frac{WV^2}{gr}$

where W = weight producing C.F. in pounds,
V = velocity of weight in feet per second,
g = 32.2 feet per second per second,
r = radius of weight in feet.

In our case, W = .618 lbs.,
V = 139 feet per second,
g = 32.2
r = .156 feet.

Therefore C.F. acting on any single Coupling Pin =

$$\frac{.618 \times 139 \times 139}{32.2 \times .156} = 2,380 \text{ pounds.}$$

Load on Coupling Pin from C.F. = 2380 pounds acting radially from the centre of the shaft.

Load on Coupling Bolt due to Motor Torque.

Total load absorbed by six bolts = $\frac{130 \times 33000}{8350}$ = 514 lbs.

Load per Bolt = $\frac{514}{6}$ = 86 pounds approx.

This force acts at a tangent to the pitch circle.

It should here be noted that the load per coupling pin from centrifugal force is 2,380 pounds and the load from the 130 b.h.p. motor torque is only 86 pounds, in other words, the centrifugal force load is 27.6 times that of the motor torque, and this very important fact should always be borne in mind and carefully investigated when designing a flexible coupling of the pin and bush type for high speed of operation.

We will not bother to make a vector diagram for the actual resultant pin load as the second load is so small compared with the first, but it will suffice to simply add the two pin loads together, the total pin load will then be 2,466 pounds, or 1.1 tons.

The writer originally designed the coupling pin as a solid pin with a very small collar; it was found, however, that the pin stress was far too high, due to the centrifugal force set up by the heavier pin, and the weights taken in the preceding calculation for centrifugal force are for the final type of pin, i.e., a partly hollowed pin, as shown in the detail drawing of the coupling, and in Fig. 4 showing the pin loading, the section of the pin, and the moment arm of the load, etc., from which the stress calculations are made.

The coupling pin in operation will be subjected to various simple and compound stresses, which we will now proceed to analyze.

Design of an Ultra High Speed Flexible Coupling—continued

Stresses in Coupling Pin

(See also Fig. 4).

Stress at Section WW.

The stress at Section WW is a simple bending stress.

Bending Moment = $1.1 \times .625 = .69$ inch tons.

The Section modulus for the given hollow pin section is obtained by subtracting the moment of Inertia of the two pin sizes and dividing the result by the distance of the extreme fibre from the neutral axis.

Thus Moment of Inertia $\frac{3}{4}$ dia. = .01553
 " " " $\frac{1}{2}$ dia. = .00306

Nett Moment of Inertia = .01247

Therefore Section Modulus of hollow pin $Z = \frac{I}{c} = \frac{.01247}{.375} = .0332$

Stress $\frac{BM}{Z} = \frac{.69}{.0332} = 21$ tons per sq. in.

Stress at Section WW = 21 tons per sq. in.

The steel used in the manufacture of the coupling pins was 60 tons ultimate tensile with yield point at 40 tons per sq. in.; a comment will be made at the conclusion of the calculations with regard to the working stresses at various sections.

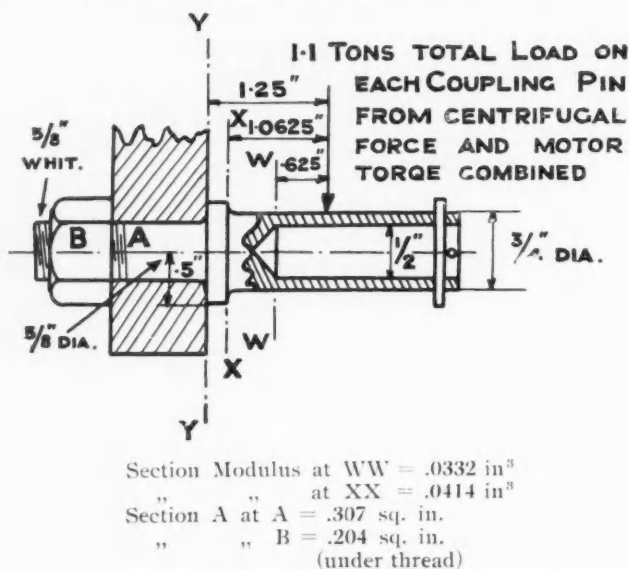


Fig. 4. Showing Pin Loading and Section of Pin.

Stress at Section XX.

Here, again, the stress is a simple transverse bending stress, but is resisted by the section modulus of $\frac{3}{4}$ solid diameter pin section.

Bending Moment = $1.1 \times 1.0625 = 1.17$ inch tons.

Section Modulus $\frac{3}{4}$ diameter = .0414, therefore

Stress $\frac{1.17}{.0414} = 28$ tons per sq. in.

Stress at Section XX = 28 tons per sq. in.

Direct Tensile Stress at "A" just inside Collar.

The collar on the pin reduces the bending stress on the pin considerably, but due to a couple gives a direct tensile stress at "A."

Diameter of "A" = $\frac{1}{2}$ -in. diameter, Area at "A" = .307 sq. in.

Direct Tensile Stress at "A" = $\frac{1.1 \times 1.25}{.5 \times .307} = 9$ tons per sq. in.

Call Direct Tensile Stress at "A" t .

$t = 9$ tons per sq. in.

Direct Shear Stress at "A." Call this Stress S , then

$S = \frac{1.1}{.307} = 3.6$ tons per sq. in.

Direct Shear Stress at "A" $S = 3.6$ tons per sq. in.

The Stress at Section YY is best expressed as—

(1) A Resultant Tensile Stress at YY.

(2) A Resultant Shear Stress at YY.

Resultant Stresses at Section YY.

(1) The Resultant Tensile Stress at Section YY = R_t .

Then $R_t = \frac{1}{2}t + \sqrt{S^2 + \frac{1}{4}(t^2)}$

Where t = direct tensile stress previously found to be 9 tons per sq. in.

S = direct shear stress previously found to be 3.6 tons per sq. in.

Therefore $R_t = \frac{1}{2}t + \sqrt{S^2 + \frac{1}{4}(t^2)}$

$= 4.5 + \sqrt{3.6^2 + \frac{1}{4}(9^2)}$

$= 4.5 + 5.75 = 10.25$ tons per sq. in.

Therefore Resultant Tensile Stress at YY = 10.25 tons per sq. in.

(2) Resultant Shear Stress at Section YY.

Let R_s = The Resultant Shear Stress at YY.

Then $R_s = \frac{1}{2}\sqrt{S^2 + \frac{1}{4}(t^2)}$

$= \frac{1}{2}\sqrt{3.6^2 + \frac{1}{4}(9^2)} = 5.75$ tons per sq. in.

Therefore Resultant Shear Stress at YY = 5.75 tons per sq. in.

Stress in Threaded Portion of the Coupling Pins.

This is a direct tensile stress and is imposed by the collar on the pin setting up a direct couple.

Arm of Load = 1.25-in.

Arm of Resistance = .5-in.

Therefore Direct Tension Load = $\frac{1.1 \times 1.25}{.5} = 2.75$ tons load.

Area of $\frac{1}{2}$ Whitworth thread (under thread) = .204 sq. in.

Therefore Direct Tensile Stress under thread = $\frac{2.75}{.204} = 13.4$ tons per sq. in.

Summary of Stresses in Coupling Pins.

Position of Stress	Nature of Stress	Magnitude of Stress
Section WW...	Simple Bending Stress	21 tons per sq. in.
Section XX...	Ditto	28 tons per sq. in.
Section YY...	Resultant Tensile Stress	10.25 tons per sq. in.
Section YY...	Resultant Shear Stress	5.75 tons per sq. in.
At "A"...	Direct Tensile Stress	9 tons per sq. in.
At "B"...	Ditto	13.4 tons per sq. in.

The Bending stresses in the coupling pins may seem a little on the high side despite the fact that 60 tons ultimate Tensile Steel has been used in their manufacture. Candidly, had more room been available to accommodate the new design of coupling the bolt sizes would have been slightly increased, but this was not possible in this case, but in the actual assumptions made the worst possible condition has been assumed, viz., that the leather bushes offer no support whatever to the pins against deflection by centrifugal force, whereas more likely the force would be resisted partly by the pin strength and in a lesser degree by support from the leather bush.

It was impossible to increase the size of the bolts owing to the limited space, and as "Needs must when the Devil drives" the $\frac{3}{4}$ external diameter bolts were fitted.

Bearing Pressure on Leather Bushes.

First assume the leather bushes take the load from the horse power torque only, i.e., the pins are assumed to be self-supporting against the load from centrifugal force.

Length of Leather Bush = 1.375-in.

Internal bore " " = 1-in.

Projected area of bore = 1.375 sq. in.

Load on bush from motor horse power = $\frac{130 \times 33000}{8350 \times 6} = 86$ lbs.

Therefore Pressure per square inch on projected area of Leather = $\frac{86}{1.375} = 62\frac{1}{2}$ lbs. per sq. in.

This figure being well inside the permissible pressure.

Now consider the pin not self-supporting against centrifugal force and that the pins would have to rely on support from the leather bushes.

Maximum load on Bush from centrifugal force and b.h.p. of motor = 1.1 tons or 2446 lbs.

Then pressure per sq. in of projected area = $\frac{2446}{1.375} = 1780$ lbs. per sq. in.

As this figure is far in excess of the permissible working pressure on the leather bushes which should not exceed 200 to 300 pounds per sq. in. for the type of bush considered (i.e., end located), it will immediately be seen that the pins must be made self-supporting against centrifugal force, as mentioned in the early part of the calculations.

The couplings as designed were fitted to four machines and have been in constant use for nine months; no trouble whatever has been experienced, and on recent examination there was absolutely no sign of deterioration of any of the leather bushes. Whereas formerly, after nine months or even less, it was constantly found necessary to renew the complete spline type couplings.

These results it is considered conclusively prove that the leather bush type coupling is a better proposition than the spline type, and if properly designed with due regard to the effect of centrifugal force, it may safely be employed at very high speeds.

Notes from the North

Reclaiming of Foreshore.

SEVERAL acres of beach are being reclaimed from the sea at St. Annes, and work has just been started upon the construction of a sweeping curve of new promenade, about a quarter of a mile long, which will enclose this portion of the shingle. On this reclaimed land, a children's boating lake, $2\frac{1}{4}$ acres in extent, is rapidly approaching completion. A feature of the new promenade is that it is actually being constructed below the level of a portion of the beach. In some parts the sea has piled up huge banks of shingle so high that it has not washed the feet of the promenade for years. A huge channel has been excavated through shingle to accommodate the new promenade. It is proposed to remove about 100,000 tons of shingle.

Cost of Mersey Tunnel.

The Mersey Tunnel Joint Committee reports the revised figures show the total capital cost of the tunnel at £7,475,500, reduced by the Government grant of £2,500,000 to £4,975,500. In order to bring the charges for commercial vehicles into line with those on the ferries, it was resolved to authorise the following revised tolls:—Up to 20 cwt. (instead of 12 cwt.) 1s.; exceeding 20 cwt. and not exceeding 30 cwt., 1s. 6d.; exceeding 30 cwt. and not exceeding two tons, 2s.; exceeding two tons and not exceeding four tons, 2s. 6d. An additional toll booth is to be erected at New Quay, on account of increased traffic at the entrance.

Menai Bridge.

A joint committee of Caernarvonshire and Anglesey representatives has issued a report to the Anglesey and Caernarvonshire County Councils, urging, in the first place, that the Councils do not treat with the Ministry of Transport for the control and custody of the Suspension Bridge, on the ground that the bridge is well nigh obsolete; and recommending instead that negotiations be resumed for the construction of a new bridge, free from toll, by the Ministry of Transport, with an undertaking that the County Councils jointly accept the future responsibility of the bridge on terms similar to those now in operation for the maintenance of Class I roads. The Anglesey County Council has accepted and adopted the recommendations. It is felt, however, that the question of cost would loom rather too large to permit of very serious consideration at the present time.

Ribble Dock Undertaking.

Mr. J. G. Merriweather, traffic manager and general superintendent of the Ribble Dock undertaking in an address at Preston, said that at least £200,000 per annum is earned by employees at Preston Docks.

In the financial year ending 31st March, 1934, there was a surplus on the undertaking of £62,991, he explained, but the debt still outstanding was £1,106,775. He was firmly of the opinion that when the sinking fund had been reduced to a reasonable figure, the dock undertaking would prove the success which its original supporters visualised. In about ten years the first large expenditure of approximately £750,000 would have been redeemed by the application of the sinking fund, and unless there was any considerable expenditure in the meanwhile, Preston ratepayers could look forward to a substantial relief.

The first Ribble Navigation Company was constituted in 1806, the capital being £2,000. In 1830 the Preston Corporation purchased a share in the company, and seven years later they agreed to subscribe £10,700. About the years 1878 to 1880 the Corporation purchased the undertaking for £72,800, and in 1883 obtained an Act for vesting all previous powers in them and for the construction of a 30-acre dock, diverting the river and other works.

It was not until 1931 that the Corporation decided to proceed with the completion of a long-visualised scheme of extending the walls to 16 miles from Preston, but in that year they obtained an Act authorising the work to be carried out. Work began in May, 1932, and would take seven years to complete.

It was reported to the Preston Town Council that for the six months ended September 30th, the increase of revenue from the Ribble Dock undertaking was £17,400. All the principal imports, with the exception of one, which showed a slight decrease, were up. On the six months' financial statement, after paying interest and sinking fund, there was a credit balance of £3,800, compared with a debit balance of £12,600 at the same period last year. It was the best six months' work they had had, said Ald. W. Lucas. He did not like to prophesy, but he thought they would be in credit at the end of the next six months, and they hoped to have a better balance than ever before. The dock had a good name.

Whitehaven Harbour.

At the Whitehaven Town Council, Alderman W. Stephenson, the Mayor, expressed the hope that the outcome of the report of the Government Commissioners to Cumberland would be the provision of a new dock at Whitehaven Harbour.

Over-subscribed.

Three minutes after the subscription list was opened, the issue of £2,062,628 Mersey Docks and Harbour Board 3½ per cent. redeemable debentures at 97 per cent. was heavily over-subscribed to the extent of many millions.

Laying-up Charges.

Mersey Docks and Harbour Board has notified the Liverpool Chamber of Commerce of its intention to make certain concessions in their standard charges for vessels laying up, and in respect of vessels entering the port for the sole purpose of using their graving docks.

New Fleetwood Pier.

The Fleetwood Pier Company have decided to launch a £10,000 improvement and extension scheme, work on which is to begin at once. The alterations include the provision of covered accommodation for over 2,000 people. The east side of the pier is to be extended on the cantilever principle and is to be covered with glass.

Foreshore Gravel.

The Peel (L.O.M.) Town Commissioners, who make a good profit each year from sand receipts, are now considering whether to permit gravel to be removed from the shore. The Commissioners have adopted this resolution:—"That the Board reserve to themselves the right to remove gravel and shingle off Peel shore for carting to Boiley Spittle, and that such material be used for town work or sold as and when required."

Peel Pierhead.

Isle of Man Tynwald has moved that the sum of £2,000 voted for the repair of Peel bridge shall be transferred to the re-building of the old pierhead at Peel. The Receiver General explained that since the money was voted in June the Harbour Commissioners' engineer had been laid up and the plans for the repair of the bridge had not been approved, so that in order that the Board should keep faith with Tynwald and employ as many men in Peel, the money should be transferred for work on the pierhead. The bridge work, which was not pressing, could be carried out at a later date.

Fleetwood Ferry Service.

Fleetwood Corporation Ferry Committee has had under consideration tenders for the supply of a ferry steamer for the Knott End service. Originally the committee called for tenders to include a Diesel-driven vessel, but then decided to invite the tendering firms to submit new prices to include a boat driven by a different kind of engine.

It was anticipated that the difference in cost would be considerable, but the committee received a tender from a Northwich firm of builders in which the difference amounted to only a few pounds. The committee decided to visit the works of the Northwich firm and discuss the question further.

Ellesmere Port Development.

The Ellesmere Port depot of Lobitos Oilfields, Ltd., was officially opened recently in the presence of a large number of guests, most of them business men.

Mr. H. C. R. Williamson, who presided at the celebration luncheon, said it seemed not unreasonable to hope that the British Government would, in the near future, recognise the desirability in the national interest of fostering the refining of oil in this country and grant some preference to British refined oil.

The new Lobitos Refinery is centred in one of the main industrial areas of Great Britain, in close proximity to the Manchester Ship Canal and served by the railway of the London, Midland and Scottish and Great Western joint system. Erection of the refinery was commenced less than a year ago. It is a full-range straight distillation unit. In one operation benzine, kerosene, gas oil, lubricating oils and bitumen residue are obtained. The plant is actually in two interconnected sections. One half, from which the benzine, kerosene and gas oil are obtained, works under atmospheric pressure. The other half, which picks up the residue from the first half and produces from it lubricating oils and bitumen, works under a vacuum. The two sections can be run together independently. The refinery equipment includes an efficient blending plant in order that straight or blended oils may be available.

Notes from the North—continued

Mersey Pilotage.

All the pros and cons of the Point Lynas pilotage station of the Mersey Docks and Harbour Board were brought forward at the Board of Trade inquiry held at the offices of the Mersey Docks and Harbour Board, Liverpool. Certain steamship owners' associations made application for an order under the Pilotage Act (1913) to amend the limits of the Liverpool pilotage district to provide for the abolition of Point Lynas Station, for compensation for pilots incurring loss or damage thereby, for a compensation rate for such purpose, and for consequential purposes. Applicants held that the station could, with safety, be abolished. Its closing would save £18,000 a year.

Outward pilotage ends at the Mersey Bar; inward pilotage, between Point Lynas and the Bar, is obligatory. The ship-owners claim that arrangements could be made at the Bar which would enable pilotage to begin and end there without danger or difficulty. The pilots offered strong opposition to the proposal.

Speaking at the original choice of Point Lynas at the Western Pilotage Station, Mr. E. A. Digby, for the applicants, said it was before steam superseded sail. The prevailing winds were westerly, and Point Lynas generally afforded more shelter than could be obtained at the Bar. Sometimes, however, Point Lynas in easterly winds was less sheltered than the Bar. From 1898 there had been steam pilot boats. The Dock Board prided themselves in thinking that the Bar Lightship was one of the finest lightships in the world. Since the war, too, further buoys had been put down, and more lights introduced, which made the Bar and vicinity better for navigation.

The pilots contended that the abolition of the station would seriously impair the efficiency of the pilot service, without effecting any material economies. The Bar vicinity, as a pilot boat cruising area, they alleged was too open and exposed, to make it practicable to maintain a safe boarding station there.

Mr. J. H. Tilman, chairman of the Pilotage Committee of the Mersey Docks and Harbour Board, said the full Board accepted the scheme in principle by a majority of seventeen to

three. He was satisfied that it was feasible to work an efficient scheme in a reduced pilotage area as suggested. Mr. Tilman said experience showed that ships inward-bound to Liverpool began to require the services of pilots at the Bar and not at Point Lynas.

Capt. F. W. Mace, marine surveyor to the Dock Board, describing the lighting of the Mersey estuary and channels, said the Bar Lightship was one of the finest in the world; it had a light of 40,000 candle-power, which was high for a floating light; a siren, a wireless beacon with a range of 50 miles; it sent out aerial signals during fog and also in fine weather; it sent out a signal by morse every six minutes during fog, and, in addition, there was a submarine-oscillator. For the purpose of soundings the approaches to the Bar were good.

Capt. Mace also said it was better that the pilot should be boarded at Point Lynas during fog and mist, because with the pilot's local knowledge and experience, he was better fitted to bring a ship, under those conditions, from Point Lynas to the Bar, than a shipmaster who might only occasionally have visited this port.

Barry Docks.

Three hundred of the employees of the former Barry Railway Company were entertained at Barry by Lord Davies, in celebration of the 50 years' anniversary of the cutting of the first sod for the construction of the docks. On 14th November, 1884, Lord Windsor cut the first sod for the construction of Barry Docks, which transformed the small rural hamlet of Barry into the thriving township of the present day with nearly 40,000 inhabitants, and to one of the greatest coal exporting ports of the world.

On the high ground in the front of the old Barry Railway Head Offices is a statue of the late David Davies, dominating the panorama of the docks, David Davies being shown as looking at a scroll plan of the great undertaking. In the main staircase of what was once the head offices of the Barry Railway, is a bronze bust of the late Edward Davies, father of Lord Davies, who continued as a director of the Barry Railway Company, until it disappeared as an entity.

A New Capstan

"Above Ground" Capstan with Unique Features

One of the most unobtrusive but essential features of the equipment of goods yards, docks, canal locks, etc., are the capstans required for all types of haulage duties.

It is essential that this gear should be designed to occupy as little space as possible and to give an unobstructed rope lead in any direction.

Messrs. Clarke, Chapman and Co., Ltd., of Gateshead-on-Tyne, who for many years specialised in the manufacture of ships' deck auxiliaries and who have paid particular attention to the development of hoisting and hauling gear of every description, have recently revised their design of "Above Ground" Capstan, and this contains a number of features worthy of notice.

The motor which drives the capstan head by means of worm and spur gearing is mounted inside the head. The gearing is contained inside a strong oil-tight gear case, and the final drive to the head is by means of a rack and pinion. The motor and gear boxes are easily accessible.

The capstan takes up a minimum of ground space, and no special foundations are required. This enables it to be used in such places as between railway tracks where the box or plate-type capstan could not be accommodated.

A double diameter head is provided to allow light loads and slack rope to be handled at a greater speed than full load.

The motor can be either A.C. or D.C., and has a strong fabricated steel stator or yoke which forms the king post for carrying the capstan head.

The rotor or armature is mounted on a sleeve, which can be quickly removed from the motor shaft as a complete unit without disturbing the sliprings or commutator and windings. Special precautions have been taken to ensure that the windings will be able to stand the most vigorous conditions. Any type of control can be supplied.

The capstan's neat appearance is indicative of the careful design that ensures freedom from trouble in operation.

This gear is made in a number of standard sizes, ranging from 5 to 10 ton duties, and in addition can be designed for any duty where required.

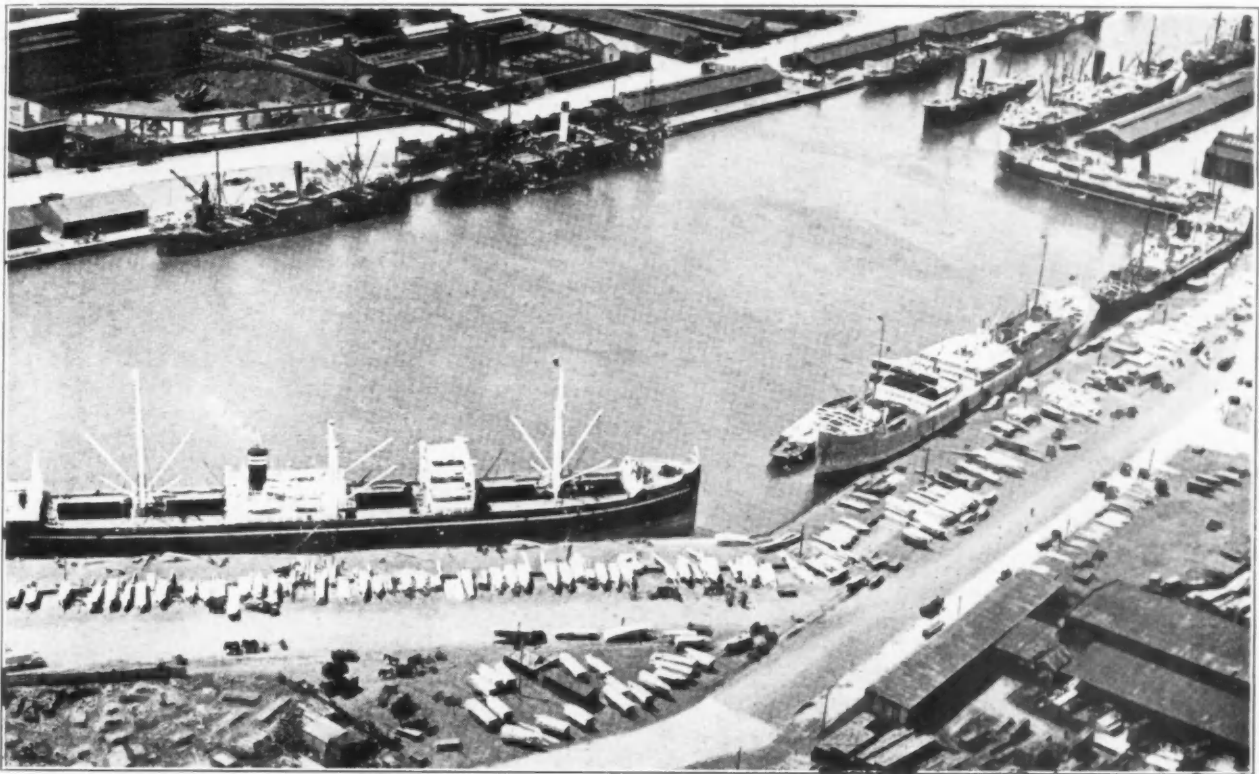


The "Above Ground" Capstan.

The Port of Melbourne, Australia

Melbourne, the Capital of Victoria, is on the River Yarra, which falls into Hobson's Bay at the Head of Port Phillip. Lat. 37° 49' 53" S.; Long. 144° 58' 30" E. It has an Area of 196.47 square miles and a Population of 1,030,750

(continued from page 10)



Interstate Swinging Basin and Timber Discharging Berths.

The gross tonnage of shipping in the port during the year 1933 was 11,861,317 tons, which was a decrease of 567,573 tons under that of the record year of 1927, but an increase of 813,109 over that of 1932. The number of vessels was 3,188, and thus the average tonnage of the vessels visiting the port is 3,721 tons, as compared with 3,711 tons in 1932.

Average gross tonnage of vessels visiting the port, and the average cargo carried per gross ton, are as follows:—

OVERSEA.

Year	No. of Vessels	Gross Tonnage	Average Gross Tonnage	Cargo in and out	Average Cargo per Gross Ton
1919	1,127	4,459,512	3,948	1,899,919	.43
1920	1,173	4,990,731	4,255	1,796,777	.36
1921	1,266	4,570,294	3,610	1,861,609	.41
1922	1,351	7,035,326	5,208	2,101,903	.30
1923	1,081	7,952,258	7,356	2,072,189	.26
1924	1,021	7,470,062	7,316	2,422,783	.32
1925	1,049	7,654,563	7,297	2,360,764	.31
1926	1,048	7,888,366	7,534	2,559,030	.32
1927	1,111	8,316,051	7,485	2,753,603	.33
1928	1,038	8,016,472	7,723	2,421,316	.30
1929	1,073	8,206,119	7,648	2,820,265	.34
1930	946	7,550,206	7,981	2,137,006	.28
1931	806	6,729,786	8,350	1,695,356	.25
1932	892	7,451,948	8,365	1,997,976	.27
1933	939	7,958,213	8,475	2,204,762	.28

INTERSTATE AND STATE.

Year	No. of Vessels	Gross Tonnage	Average Gross Tonnage	Cargo in and out	Average Cargo per Gross Ton
1919	2,367	2,495,892	1,093	1,681,373	.67
1920	3,078	2,664,502	866	1,960,073	.74
1921	3,468	4,125,793	1,190	2,118,070	.51
1922	3,226	4,054,089	1,226	2,419,953	.60
1923	3,101	3,863,297	1,245	2,564,201	.66
1924	3,102	4,363,354	1,406	2,614,449	.60
1925	2,881	3,903,759	1,355	2,533,825	.65
1926	2,903	4,014,148	1,362	2,432,511	.61
1927	2,707	4,112,839	1,414	2,566,088	.62
1928	2,674	3,696,868	1,383	2,309,434	.62
1929	2,453	3,720,931	1,517	2,044,026	.55
1930	2,268	3,710,191	1,636	1,749,678	.47
1931	2,063	3,532,765	1,712	1,627,150	.46
1932	2,082	3,566,260	1,713	1,937,233	.54
1933	2,249	3,903,104	1,735	2,149,438	.55

DISTRIBUTION OF TRADE.

	Imports		Exports		Tonnage	
	1932	1933	1932	1933	1932	1933
1. Melbourne Wharves	71.55	71.41	65.72	64.25	62.53	63.72
2. Port Melbourne Piers	3.11	3.21	13.99	16.27	25.32	25.97
3. Newport	9.70	9.83	.66	.91	3.48	2.79
4. Williamstown Piers	0.70	.83	18.92	17.85	5.13	4.02
5. Yarraville	12.32	12.51	.28	.18	3.15	3.07
6. Footscray	1.95	2.12	.41	.49	.26	.29
7. Other Wharves & Piers	.07	.09	.02	.05	.13	.14
	100	100	100	100	100	100

The principal commodities imported and exported at the Port of Melbourne are shown in the following lists, arranged in the order of their importance as regards annual tonnage:—

Imports.

Coal, motor spirits, paper, crude and enriched oil, sugar, timber, phosphatic rock, drapery, bags and cornsacks, wood pulp, steel, tinplates, grain, oils, tea, galvanised and pig iron, tobacco, cigars and cigarettes, asphaltum and bitumen, ceiling material, gypsum, motor cars and parts, various wire, fresh and dried fruit, cotton piece goods.

Exports.

Wheat, flour, wool, meats, fresh fruits, vegetables, butter, dried fruits, oils, ales and beer, grain, drapery, skins, hardware, rubber goods, vehicles, bags and cornsacks, manures, groceries, powdered and dry milk, jams and jellies, machinery, tallow, sugar.

Swinging Basins.

(a) The Interstate Swinging Basin is a quarter of a mile below the Spencer Street Bridge in the River Yarra, and is 700 ft. wide.

(b) The Victoria Swinging Basin, 900 ft. wide, is also in the River Yarra, at the entrance to the Victoria Dock.

(c) An area, 1,020 ft. wide, inside the Victoria Dock is used by vessels swinging.

(d) The construction of the Appleton Swinging Basin, 1,090 ft. wide, at the entrance to the proposed Appleton Dock, upon which certain dredging has been carried out, is being held in abeyance pending a revival in trade.

The Port of Melbourne, Australia—continued

(c) Work has been commenced on the Holden Swinging Basin at the junction of the Maribyrnong River and Coode Canal. This basin will be 1,090 ft. in diameter, but at present it is intended to dredge and remove approximately 2,000,000 cubic yards of material giving a basin 900 ft. in diameter. When this undertaking has been completed the necessity of oil tankers proceeding higher up the river to swing will be obviated.

Abstract.

Sheds.—39 Open Portions and 43 Closed Portions.

	Lin. Feet		Miles
Total length of closed portion ...	10,504 ft.	8 in.	= 1.98
Total length of open portion ...	8,433 ft.	5 in.	= 1.59
Grand Total ...	18,938 ft.	1 in.	= 3.57

	Sq. Ft.	A.	R.	P.
Total area of closed portion ...	664,166	= 15	0	39-6 10ths
Total area of open portion ...	583,547	= 13	1	23-8 10ths
Grand Total ...	1,247,713	= 28	2	23-4 10ths

N.B.—Deducting 20 per cent. from the total area of Sheds for roads and alley-ways through the cargo, and taking an average load of 4 cwts. per superficial foot as stacked, the accommodation provided by the Sheds for the receipt of cargo amounts to 199,644 tons (approx.).

Wet Shed.

In addition to the various sheds on the wharves, there is a shed known as the "Wet Shed," situated opposite No. 6 Berth, Victoria Dock. This shed has two floors giving a total floor area of 57,000 sq. ft. It is provided with four hydraulic lifts, a testing laboratory and office accommodation for Customs officials, the Police Patrol, and Harbour Trust officers, and is used for the purposes of the storage and grading of spirits as well as a free store.

All spirituous liquors, delivery of which has not been taken by the respective consignees at the transit sheds within 48 hours of the time of landing, must be removed to this shed where gauging, testing and sampling takes place.

Telephones.

Telephones have been installed in all sheds on the wharves at Melbourne and on each of the piers at Port Melbourne and Williamstown, for the convenience of the shipping companies using the berths.

Portable telephones are available for use on board vessels at the various wharves and piers. These are placed on board by the Trust's Dockman immediately the respective vessels berth, unless refused by officials of the Company.

Berthage Accommodation in the Port.

The wharfage space available and the depth of water at the several wharves and piers within the Port of Melbourne are as follows:—

	Berthing Space in feet	Depth in feet L.W.O.S.T.
Breakwater Pier, Williamstown ...	713	31
Gellibrand Pier, Williamstown ...	2,109	34
Nelson Pier, Williamstown ...	1,976	34
Graving Dock Pier, Williamstown ...	1,150	28
Reid Street Pier, Williamstown ...	900	20
Ann Street Pier, Williamstown ...	1,444	18
Gem Pier, Williamstown ...	650	12
Ferguson Street Pier, Williamstown ...	260	12
Prince's Pier, Port Melbourne ...	2,650	37
	400	10-34
Station Pier, Port Melbourne ...	2,860	37
	1,680	18-34
Town Pier, Port Melbourne ...	850	28
Newport Wharf (River) ...	800	30
Spotswood Bottle Works Jetty ...	39	14
Yarraville Wharf (River) ...	2,177	26
Footscray Wharf, below Napier Street Bridge	860	16
Footscray Wharf, above Napier Street Bridge	940	13-14
North Wharf (River) ...	7,089	27
South Wharf (River) ...	10,836	27
Victoria Dock, Berths 1-24 ...	12,973	30
Appleton Dock ...	250	28
Kerford Road Pier, Albert Park ...	200	12
	53,806	

The Port Melbourne Channel leading to Prince's and Station Piers has been dredged throughout its whole length and width to a depth of 34 ft. at low water.

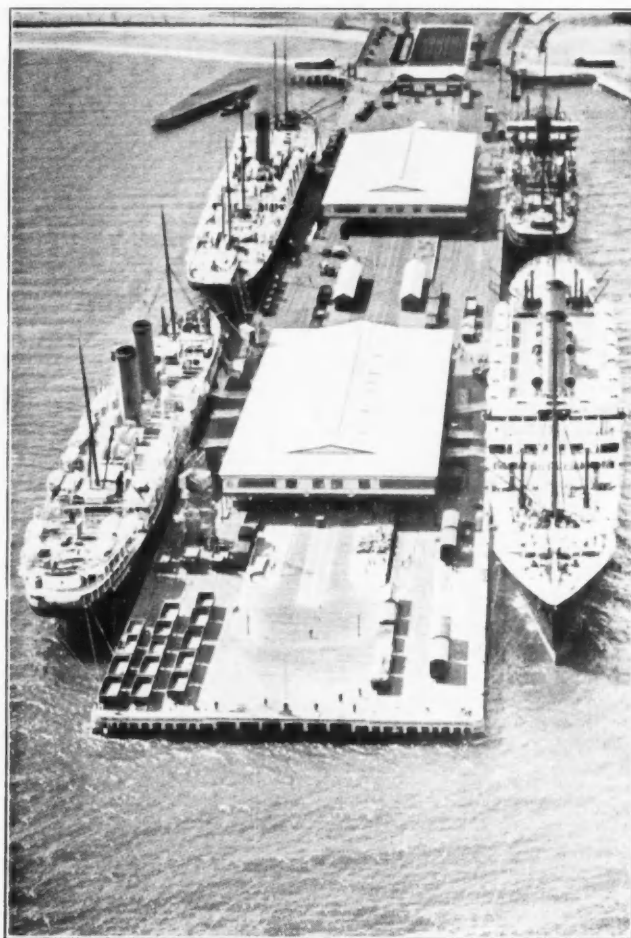
Further dredging operations are being carried on in this channel to attain a depth of 37 ft. at low water.

The depth of Victoria Dock is limited by the River Channel, which is maintained at a depth of 28 ft.

Wharves, Piers, Jetties, etc.

	LENGTH		AREA	A.	R.	P.
	Lin. ft.	Miles	Sq. ft.			
Yarra Wharves and Victoria & Appleton Docks ...	32,839	= 6.22	1,288,326	= 29	2	12-2 10
Hobson's Bay, Wharves and Piers and Lower Yarra, Etc. ...	30,580	= 5.79	1,416,550	= 32	2	3
	63,419	= 12.01	2,704,876	= 62	0	15-2 10

Lineal feet of Piers includes both sides.



Station Pier, Port Melbourne.
Length, 2,182-ft. Width, 195-ft. Depth of Water, 37-ft.

Summary of Accommodation within the Port.

There are 82 sheds on the wharf structures—39 open and 43 closed—having a length of 18,938 ft. and an area of 28 acres 2 roods and 23½ perches.

The depth of water is 37 ft. at Port Melbourne, 34 ft. at Williamstown, 30 ft. in the Victoria Dock, and 28 ft. in Lower Yarra.

The greatest number of vessels (including only vessels working and not those laid up) in port at the one time was:—

	No.	Gross Tonnage
Ocean-going ...	30	177,923
Interstate ...	28	66,477
Intrastate ...	7	3,926
	65	248,326

The present effective berthing space in the port is 53,806 ft. equal to 10.2 miles with an area of over 62 acres of wharf space.

Wharves connected with Railways.

The total length of 18,541 ft. of wharfage has been provided with rails which connect with the general railway system. It is made up as follows:—10,982 ft. on the Bay Piers, 800 ft. at Newport, 450 ft. at Yarraville, 6,309 ft. at the Victoria Dock and the Berth in the River upon which the 60-ton crane is erected. The gauge is 5 ft. 3 ins.

Approaches to Wharves.

The roads giving access to the River and Victoria Dock wharves have recently been re-constructed and consist of strips of bluestone pitchers and strips of reinforced concrete with a 2 in. covering of bituminous compound.

The Port of Melbourne, Australia—continued

On the south side of the river, in addition to the construction of roads at the rear of the wharves similar to those on the north side, the Commissioners have paid two-thirds of the cost of re-construction of approach roads, Normanby Road and Lorimer Street, which are situated in the Municipalities of South and Port Melbourne, the municipalities concerned paying one-third of the cost of the work in their respective areas.

A new approach road to the Station Pier, Port Melbourne, has also been constructed.

Compounding of Wharves.

In giving effect to the scheme for enclosing the wharves within a compound, 8,486 ft. of galvanised fencing and 3,972 ft. of reinforced concrete wall have been erected enclosing all the Victoria Dock wharves and the North Wharf. Three gates, in convenient positions, with accommodation for the Customs Watching staff have been placed in the fences permitting ingress and egress to and from the several wharves at which oversea vessels are accommodated. No goods are permitted to be removed from the compound without a gate-pass; this procedure, together with the activity of the Wharf Police Patrol, has reduced the pillaging of cargo to a minimum.

Plans are in hand for the early compounding of the South Wharf and the piers at Port Melbourne.

New Dredging Plant.

From time to time the Commissioners have added new units to their dredging plant to replace those which had become obsolete because of the attainment of dredging depths throughout the port for which the respective vessels were constructed. The main features of the new plant are shown as follows:—

Cranes.

The following cranes are on the wharves and piers:—
One 60-ton steam crane; one 35-ton hydraulic crane; seven 3-ton electric portable jib cranes; one 2-ton hand crane and one 10-ton hand crane.

Expenditure on Improvements.

The total expenditure on Port Improvements by the Trust amounts to £9,834,759, made up as follows:—

Floating Plant and General Plant	...	£1,201,101
Land and Property	...	556,265
Reclamation Works	...	343,480
Wharves, Sheds and Approaches	...	3,969,009
Deepening Waterways	...	3,166,064
Other Harbour Improvements	...	598,840
		£9,834,759

The expenditure on improvements during the twenty-one years, 1913-1933, was as follows:—

Floating Plant	...	£480,828
General Plant	...	51,948
Land and Property	...	547,523
Reclamation Works	...	13,432
Wharves, Sheds and Approaches	...	2,682,543
Deepening Waterways	...	2,383,398
Other Harbour Improvements	...	259,985
		£6,419,657

NEW DREDGING PLANT

Name	Description of Vessel	Construction	Length ft.	Breadth ft.	Depth ft.	Remarks
"Henry Meeks"	Centre Ladder end Cutting Dredger	Steel	165.5	29.2	10.8	Dredging depth, 60-ft. One Engine, 250 I.H.P.
"D. McLennan"	do.	do.	165.5	29.2	.8	Dredging Depth, 59-ft. One Engine, 225 I.H.P.
"Sir Wm. McPherson"	Clay Cutting Suction Dredger	do.	158.5	32.33	13.5	Cut to depth of 35-ft. One Engine, 350 I.H.P.
"D. York Syme"	do.	do.	165	35	14	
"G.F.H."	do.	do.	220	44	14.5	
"Hume"	Steam Screw Launch	do.	59.5	15.3	7.2	Engine, 150 I.H.P.
"Hovell"	do.	do.	61.83	15.83	7.12	do.
"Francis Duncan"	Steam Hopper Barge	do.	180.75	32.15	14.15	Capacity 900 cub. yds.
"Wm. Andrews"	do.	do.	180.7	32.2	14.15	do.
"W. J. Mountain"	do.	do.	170.6	33.2	13.45	Capacity 857 cub. yds.
"Wm. Cowper"	do.	do.	170.6	33.2	13.45	do.
"Whitepine"	Lighter	Iron	167.9	29.6	13.6	Capacity 700 tons.
"Mombah"	Hulk	Steel	315	50	28	Capacity 4,700 tons.

STATISTICS OF THE PORT.

The following table sets forth the total tonnage of vessels berthing, the imports and exports handled, and the revenue received at the Port of Melbourne at various periods up to December 31st, 1933:—

Year ended 31st December	Gross Tonnage of vessels	Imports	Exports	Tonnage of Goods Inwards & Outwards	Revenue from Vessels	Revenue from Goods	Other Revenue	Total Revenue
	tons	tons	tons	tons	£	£	£	£
1877 6 mths.	1,046,150	498,797	160,338	659,135	—	53,882	1,613	55,495
1878	1,948,866	1,011,699	336,868	1,348,567	—	105,913	2,559	108,472
1888	4,395,058	1,936,072	535,058	2,471,130	—	220,858	11,090	231,948
1898	5,163,002	1,608,691	638,936	2,247,627	—	147,033	19,758	166,791
1903	6,516,047	1,941,433	727,548	2,668,981	15,300	198,957	16,822	231,079
1908	8,407,852	2,539,808	897,777	3,437,585	19,732	235,306	21,145	276,183
1913	11,673,283	2,925,888	1,369,608	4,295,496	36,673	276,590	25,888	338,651
1918	5,271,180	2,542,720	1,173,674	3,718,394	52,369	222,391	50,831	325,591
1923	11,815,615	3,382,323	1,254,067	4,636,390	159,867	475,242	57,027	692,136
1927	12,428,890	3,852,273	1,467,418	5,319,691	181,056	584,330	54,281	819,667
1928	11,713,340	3,399,701	1,331,049	4,730,750	161,282	510,899	59,106	731,287
1929	11,927,050	3,348,595	1,515,696	4,864,291	170,983	553,543	61,822	786,348
1930	11,260,397	2,637,538	1,256,751	3,894,289	143,170	420,862	63,310	627,342
1931	10,262,551	1,896,221	1,426,245	3,322,506	112,221	264,267	48,656	425,144
1932	11,018,208	2,376,228	1,558,981	3,935,209	115,974	350,163	44,009	510,146
1933	11,861,317	2,638,524	1,715,676	4,354,200	123,817	389,002	66,764	579,583

PARTICULARS OF DRY DOCKS IN THE PORT OF MELBOURNE:—

Name	Length	Breadth	Depth	How Operated	Remarks
	feet	feet	feet		
Melbourne Harbour Trust, Alfred Graving Dock, Williamstown	Top 459 Floor 450	Top 97 Bottom 60 Entrance 80	On Sill, L.W. 24 On Sill, H.W. 27	Floating caisson is used for closing the entrance. The dock is emptied by centrifugal pumps, steam driven.	Can dock up to 57 feet beam. Pumping plant consists of two 260 h p. steam engines and an electric drain pump. The Dock can be emptied in 24 hours. Pneumatic power and facilities for electric welding are available in the Graving Dock which is flood lit for night work. Dock side is served by 15 ton and 5 ton steam cranes.

The Port of Melbourne, Australia: Particulars of Dry Docks—continued

Name	Length	Breadth	Depth	How Operated	Remarks
Melbourne Harbour Trust. Williamstown Dockyard No. 1 Slipway	feet 360	feet 20	feet	Compressed air, but in case of breakdown of pneumatic gear a boiler is on the site for use and the Slipway winch is then operated by steam.	Can take flat bottom punts, etc., 8 feet draft.
Melbourne Harbour Trust. No. 2 Slipway	360	18		do.	Can take vessels up to 65 tons dead weight, 8 feet draft.
Melbourne Harbour Trust. No. 3 Slipway	300	9		do.	Can take up yachts and motor launches of 6 feet draft.
Hobson's Bay Yacht Club (3 cradles, 12-ft. long)	300			Electric motor and winch.	12 ton yachts, 7 feet draft.
Royal Yacht Club (1 20-ft. cradle and 1 10-ft. cradle)	300			do.	30 ton vessels, 8 feet draft.
Duke & Orrs Amalgamated Dry Docks Pty. Ltd., Yarra Bank, Melbourne	510	Top 71 Bottom 61	On Sill, L.W., 20 Max., 23-ft. 6-in.		Can dock, clean, paint and undock in eight hours; electric light installed. Can dock up to 65 feet beam and be pumped out in one hour.
do.	420	Top 60 Bottom 50	On Sill, L.W. 20 On Sill, H.W. 23		Can dock up to 53 feet beam.
Melbourne Steamship Company's Floating Dock, Williamstown.	Top 216 Bottom 200	36	On Sill, 14		Can take vessels up to 800 tons. Time to empty dock 2 hours.
Knight's Slip, No. 1	350			Steam.	Can take vessels up to 80 tons.

Aden Port Trust

The returns of Shipping using the Port of Aden for the month of September, 1934, are as follows:—

	No.	Tonnage
Merchant Vessels over 200 tons ...	126	530,443
" under 200 tons ...	—	—
Government Vessels ...	5	9,175
Dhows ...	81	2,471
PERIM.		
Merchant Vessels over 200 tons ...	22	66,476

Imports during the month were above those for September, 1933, in the case of seeds, sugar and unmanufactured tobacco; and below, in the case of coffee, grain, pulse and flour, gums and resins, hardware, raw hides, raw skins, grey, white and printed or dyed piece goods, twist and yarn, manufactured tobacco and private treasure.

Exports were above those for September, 1933, in the case of grain, pulse and flour, sugar and unmanufactured tobacco; and below, in the case of coffee, gums and resins, hardware,

TRADE OF THE PORT.

Article.	Unit	Imports		Exports	
		Quantity.	Value Rs.	Quantity.	Value Rs.
Coal ...	Tons	5,464	1,63,928	0	0
Coffee ...	Cwts.	5,087	1,36,470	4,787	1,81,539
Grain, Pulse and Flour ...	"	27,800	1,34,124	24,873	1,14,032
Gums and Resins ...	"	414	8,861	1,446	19,568
Hardware ...	"	0	21,221	0	24,991
Hides, raw ...	No.	2,105	1,685	4,803	3,620
Oil, Fuel ...	Tons	21,438	5,35,950	0	0
" Kerosene ...	Gls.	22,808	15,314	5,684	3,795
" Petrol ...	"	35,600	33,035	640	720
Salt ...	Tons	0	0	25,400	2,52,600
Seeds ...	Cwts.	7,661	55,791	1,018	7,722
Skins, raw ...	No.	264,113	1,18,662	293,320	1,79,175
Sugar ...	Cwts.	19,823	91,316	19,165	91,668
Textiles—					
Piece Goods, Grey ...	Yds.	2,743,880	3,27,350	1,599,760	2,07,133
" " White ...	"	370,272	57,797	221,314	34,639
" " Printed or Dyed ...	"	680,454	1,31,676	1,007,105	1,92,868
Twist and Yarn ...	Lbs.	90,900	11,755	117,510	49,437
Tobacco, Unmanufactured ...	"	1,142,792	2,16,376	731,944	1,14,360
" Manufactured ...	"	40,757	31,865	21,558	17,338
Other Articles ...	No. of Pkges.	65,757	8,58,861	21,507	3,48,436
Treasure, Private ...	—	0	2,09,937	0	2,26,770
Total ...	—	—	31,94,977	—	20,70,351

The number of merchant vessels over 200 tons that used the Port in September, 1934, was 126, as compared with 107 in the corresponding month last year, and the total tonnage was 530,000, as compared with 441,000.

Excluding coal, salt, fuel oil and Military and Naval Stores and Transhipment Cargo, the total tonnage of imports in the month was 7,700 and of exports 5,000, as compared with 7,000 and 4,500 respectively for the corresponding month last year.

The total value of imports, excluding Government Stores, was Rs.31,95,000/-, as compared with Rs.38,17,000/- for September, 1933, and of exports Rs.20,70,000/-, as compared with Rs.26,08,000/-.

The total value of both imports and exports together was Rs.52,65,000/-, as compared with Rs.64,25,000/- for the corresponding month last year.

raw hides, seeds, raw skins, grey, white and printed or dyed piece goods, twist and yarn, manufactured tobacco and private treasure.

Port St. Mary Sea Wall.

Port St. Mary Commissioners have had under consideration a communication from the Government Office concerning the erection of a section of the sea-wall at the Point as an unemployment scheme for the present winter. It stated that the Commissioners had been voted a sum not exceeding £675. It was decided to apply to Tynwald for leave to borrow £225, the amount to be found by the Commissioners in connection with the scheme.

North-East Coast Notes

Bunker Shipments of Coal and Oil Expanding.

OFFICIAL figures recently issued showed that bunker shipments both of coal and oil are expanding, particularly the latter. In September last 1,104,000 tons of coal were shipped against 1,100,000 tons in 1933, while the oil shipments at 31,536,000 gallons, compared with 27,227,000 gallons in 1933. These figures are for the country as a whole, but it is satisfactory to know that the Tyne has shared in this increased trade, for from January 1st to October 31st, bunker shipments at 1,346,629 tons showed an increase of 49,855 tons, while oil bunkers had increased to 15,900 tons, 3,640 tons more than in the same period of 1933.

Jarrow Slake Development.

The report of Captain Euan Wallace, the Government investigator into industrial conditions in the Tyneside area, has served to bring into prominence again the problem of developing Jarrow Slake, which he recommends should be undertaken with the object of absorbing some of the unemployed in the district.

At the meeting of the Tyne Improvement Commission in November, the Chairman, Mr. H. P. Everett, said: "All the details necessary for the Jarrow Slake scheme are available. You will remember that it was withdrawn, or suspended, because the proffered grant was withdrawn. Since then we have not been idle. We have had meetings with a view to getting it restored. We have, through the Board of Trade, approached the Chancellor of the Exchequer, so far entirely without success, but the matter is still in the hands of the Board of Trade. The principal reason we suspended our efforts two or three years ago was because the grant was withdrawn, and it was a very substantial grant. The second obstacle is the price the London and North-Eastern Railway Company want for Tyne Dock. We have spent a large amount of money investigating the figures of the London and North-Eastern Railway, and on these figures we have come to certain conclusions as to the value of Tyne Dock. Their price and ours differ very largely, and up to the present it is almost impossible to see any way by which we can overcome that difficulty. However, there are later figures to hand, and we hope from this data there will be a better prospect. We must always bear in mind that the Commission and the Railway Company have a duty to the community as well as a desire to get all the trade they possibly can."

Sir George Lunn said that there were better hopes for next year, and if only the Jarrow Slake scheme would materialise there would be a ray of hope for Jarrow. If the London and North-Eastern Railway would drop the policy of inflation regarding the price, something might be done. "If Captain Euan Wallace can persuade them to restore the grant in aid for the reconstruction work involved," he added, "the Tyne will become one of the greatest of waterways, and next year would be one of our brightest years."

The Tyne Improvement Commission are not standing alone in this matter. South Shields Council is to give its support to Jarrow's appeal to the Prime Minister for Government assistance for the scheme to develop the Slake. In a letter to the Prime Minister, it is pointed out that Jarrow Slake is a river bay near to the harbour mouth, and capable of providing deep-water docks which would be among the best in the country. Transport and other facilities are available, and exporters would be able to put their goods on board in the Tyne, while importers would enjoy equal benefits. In view of the urgent needs of Tyneside, the Government is urged to give financial support to the scheme, which, it is argued, would be a wise expenditure of public money.

Another question raised was in regard to the crossing of the Tyne near its mouth either by bridge or tunnel. Mr. H. P. Everett, at the meeting of the Tyne Commission, said that North and South Shields Corporations had made an application to the Ministry of Transport with a view to receiving a grant, but he (the Minister) had asked them to get the views of the Commission. A deputation had met a sub-committee of the Commission, and the sub-committee recommended to the Board that any proposal to erect a bridge over the river between North and South Shields be strenuously opposed, but that consideration be given to the proposal for the construction of a tunnel, subject to terms and conditions which would give adequate protection to the Commissioners' interests. The Board agreed with the recommendation of the sub-committee.

Jarrow Town Council have approved plans for the construction of new oil storage tanks of 4,000 tons capacity for the Shell-Mex and B.P. Co., at their Jarrow depot. The construction of the tanks will give employment to a considerable number of men for several weeks, and will make 11 large tanks and 12 smaller ones at the depot with a total capacity of about 50,000 tons.

Quick Tyne Despatch.

There are several instances of quick work on the Tyne to record, and the London and North-Eastern Railway Company recently announced some remarkable instances at Tyne Dock. The steamer "Blackhill" arrived at Tyne Dock at 4.35 a.m. on October 11th, with a cargo of 3,850 tons of Spanish iron ore, discharge of which commenced at 8 a.m. the same day, and was completed in a total of 29 working hours, a record being established with the discharge of 3,065 tons in the 24 hours from 8 a.m. on October 11th. The vessel then proceeded to the coal spouts to load 1,900 tons of cargo and 220 tons of bunker coal, which were all on board by 1.40 p.m. on October 13th.

Even this record was soon surpassed. On October 28th the same vessel arrived from Santander with a similar cargo, discharging began at 6 a.m. on the 29th, and was completed at 1.40 p.m. the following day. This was a good turn round and a record for the ship, being two hours and twenty minutes quicker than that just mentioned. A third case was concerned with the discharge of pit props at Tyne Dock, when on October 12th the steamer "Asiatic" discharged 500 standards between 8 a.m. and 5 p.m. with five cranes working, which also constitutes a record for Tyne Dock.

Tyne Trade Review.

The latest reports laid before the Tyne Improvement Commission were entirely satisfactory. Increased receipts from dues, larger coal shipments, and less idle tonnage were outstanding features. To the end of September the coal and coke shipments were 10,467,809 tons, or 1,079,778 tons more than in the corresponding period of last year.

In commenting on these figures, Mr. R. S. Dalgliesh, at the meeting of the Tyne Improvement Commission in October, said that the actual increase to date was 1,152,000 tons. This increase was almost equally divided between coastwise and overseas trade. There had been a decrease of 26,000 tons in coke shipments attributable in some degree to German competition in Scandinavian markets. Bunker shipments were improving and over a wider range. The number of French trawlers calling for fuel was increasing, and a new trade was the arrival of Icelandic trawlers for bunkering.

Mr. Francis Priestman, chairman of the Finance Committee, said the net increase in dues for the past nine months, compared with last year, was £21,000.

It was unanimously resolved to restore the 2½ per cent. cut made in the pay of the Swing Bridge and traffic employees in July, 1931, as from the beginning of the second fortnightly pay in October. Five hundred men were affected, and the cost of the restoration would be £1,670 annually.

Able to Ship 7,000,000 tons.

At the meeting of the Blyth Harbour Commission in October, Mr. Ridley Warham, chairman, submitted comparative figures for coal shipments for the nine months ended September 30th: 1934, 4,728,573 tons; 1933, 4,103,430 tons; 1929, 4,144,364 tons.

These totals showed an increase of 15 per cent. on 1933 and 14 per cent. on 1929. If the present rate of shipment is maintained it is probable that the total for the year will amount to about 6½ million tons. This has been done without any undue detention to ships, the port facilities being adequate for the shipment of seven million tons per annum.

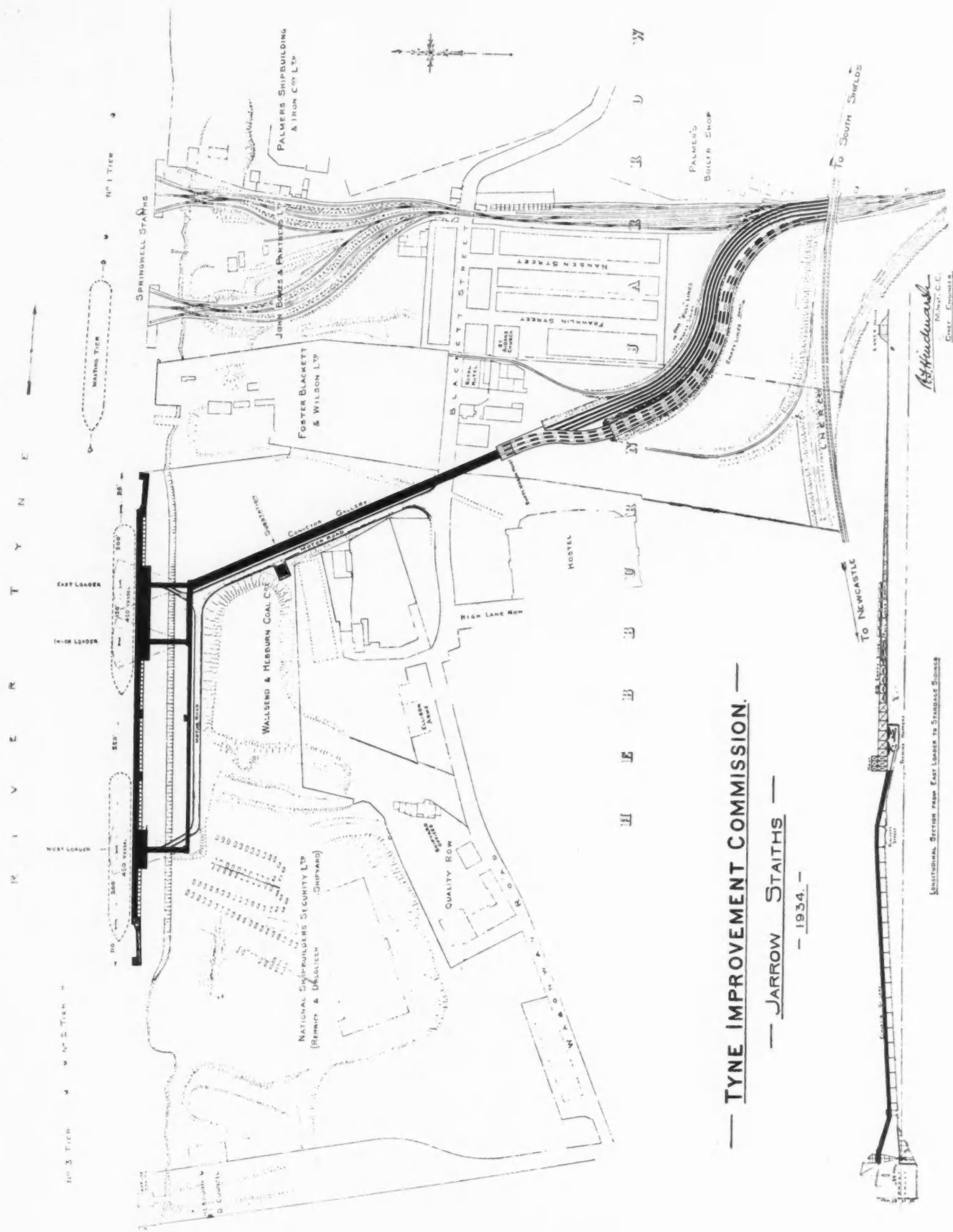
From the Wear, the shipments to the end of September were 2,976,277 tons, an increase of 32,565 tons, on the same period for 1933. Other exports totalled 35,727 tons, or 4,519 tons more than in the nine months of last year. Machinery was 1,803 tons, compared with 716 tons in 1933; pitch and tar was 10,857 tons, compared with 7,796 tons in 1933; creosote was 5,987 tons, compared with 3,333 tons in 1933; sundries 8,541 tons, against 8,192 tons in 1933; but iron and steel dropped from 1,379 tons to 696 tons; petroleum dropped from 9,790 tons to 7,843 tons.

Imports improved by 36,278 tons in the nine months, the total being 269,788 tons. There was a notable increase in the imports of timber and props which rose from 84,530 loads to 106,336 loads for the nine months of this year; iron ore, too, was brought in in much larger quantities, the imports totalling 32,782 tons, compared with 5,814 tons in 1933.

Manchester Ship Canal Company.

Mr. William Harold Bacon has been elected a Director of the Manchester Ship Canal Company by the Directors elected by the Shareholders to fill the vacancy caused by the death of Mr. F. A. Tomlinson.

The Tyne Improvement Commission



Plan of the New Staiths at Jarrow which will speed up Coal Shipments.

The Tyne Improvement Commission

New Staiths at Jarrow to speed up Coal Shipments

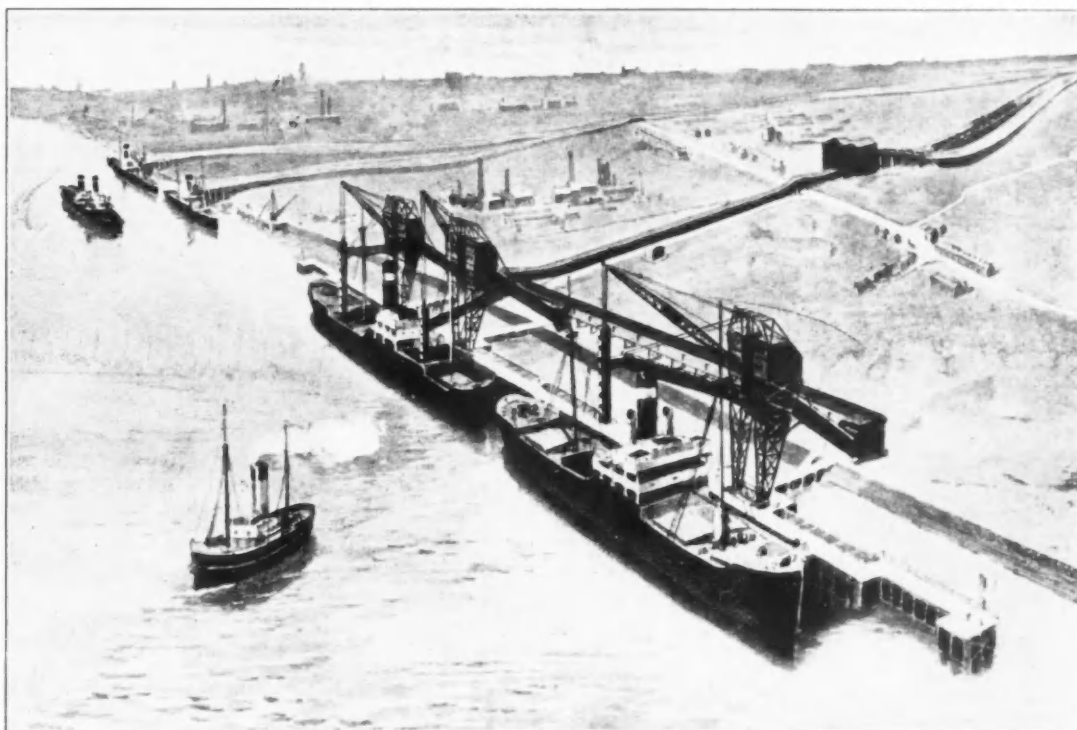
WITH a view to increasing and improving the facilities for the shipment of coal and coke on the south bank of the river, the Tyne Commissioners have begun the work of replacing the old Springwell Staiths with the latest type of plant, to be known as Jarrow Staiths.

The site is partly within the borough of Jarrow and partly in the urban district of Hebburn, and about five miles from the port entrance.

breakage, the coal being conveyed from the teeming point to the ship's hold without any sudden drop. Curved jiggling chutes, actuated electrically or mechanically, will be installed to ensure an even flow of coal.

500 Tons an Hour.

Each shipping tower with its associated conveyor is capable of dealing with 500 tons of coal per hour, or an equivalent quantity of coke.



An Artist's Impression of how the new Jarrow Staiths will appear when constructed at Jarrow and Hebburn-on-Tyne.

Preferentially, the staiths will serve the group of collieries belonging to John Bowes and Partners, Ltd., the owners of the Pontop and Jarrow Railway.

Three Towers.

There are to be three coal shipping towers, each with a radial travel of 95 feet. Ample standage for full and empty wagons is to be provided.

Coal will be discharged from 20-ton or 10-ton bottom-door trucks into three teeming hoppers feeding on to 12-in. belt conveyors, each about 1,000 feet long. Three electrically-operated hoists will elevate wagons to about 25 feet for the purpose of running off the empty wagons.

The plant has been specially designed to eliminate coal

The maximum height of delivery is 65 feet above high tide, or 80 feet above low tide at the maximum outreach of 60 feet. It will be possible also to discharge into small craft immediately alongside.

Each tower is to be fitted with a 15-ton electrically-operated jib crane for handling the anti-breaker of the Handcock type. Loud-speaking telephones are to be fitted at each control cabin and at the teeming hoppers. Dredging is to be carried out to 25 feet below low tide. The jetty will be 1,306 feet long, with ample mooring room.

The design, drawings and contract particulars have been prepared by the Commissioners' engineer-in-chief, Mr. R. F. Hindmarsh, in conjunction with Major E. H. Kirkup, chief mining engineer to John Bowes and Partners.

Reorganisation of Danube Navigation

The "Wiener Sonn-und Montags-Zeitung," of the 29th October, reports that the Danube navigation is shortly to be reorganised. Hitherto, there was a cartel in which the Austrian, Hungarian and German navigation companies, i.e., "Donau-Dampfschiffahrts-Gesellschaft," "Ungarische Fluss-und Seeschiffahrts-Gesellschaft," "Süddeutsche Donau-Dampfschiffahrts-Gesellschaft," and "Bayrischer Lloyd," participated. Besides these companies there are also various others in Czechoslovakia, Yugoslavia and Roumania operating on the Danube, and also some Dutch and French companies. Thus the Cartel was unable to organise a profitable trade. Furthermore, in spring of this year the Hungarian Company denounced their participation in the pool, as they were of opinion that they were entitled to a larger share in the business. Negotiations are said to have recently taken place in Belgrade between representatives of the Little-Entente-States, and the proposal was put forward of forming a Danube navigation cartel similar to the Austro-Hungarian German combine. It is expected that in November a Czechoslovak-Yugoslav-Roumanian cartel will

be organised. If so, both pools might be able to come to terms, and the Dutch and French companies could join in. Beginning from the next season, it would then be possible for all companies to work under a common scheme.

New Loading Bridge in Bremen.

What is said to be the most modern loading bridge on the Continent is being erected in the Industriehafen in the works of the Bremer Umschlagsund Handels A.G. Without any disturbance of work, the 86-metres wide coal-loading bridge was mounted. The rotary sliding crane was completed at the head of the harbour and then placed on the loading bridge with the assistance of the large floating crane of the A.G. "Weser." Work was carried out according to schedule, although the rotary sliding crane has a total weight of 98 tons. The loading bridge of approximately 40 to 45 tons' lift, represents the most modern and probably the largest aid to transport extant on the Continent. Three large German industries participated in the construction. In a few weeks work should be so far completed that the plant can be taken into service.

Bombay Port Trust

Administration Report, 1933-34

ALTHOUGH the main obstacles to international trade continued to operate during the year under review and any prospect of their early removal was shattered by the breakdown of the World Economic Conference in July, 1933, faint but encouraging signs of improvement in trading conditions were discernible in the latter part of the year and there was some revival of industrial activity in India and other countries, particularly those comprised in the sterling group. Until the political tension in Middle Europe abates and the effect of America's gigantic experiment in national economics can be more clearly visualised, it would be hazardous to assert that the world has turned the corner of the depression and is heading towards renewed prosperity. But although the process of adjustment to changed conditions must necessarily be laborious, the improvement in demand and in price levels of various commodities, recorded towards the close of the year, indicated that the intense economic nationalism which has been strangling international trade during the past three years is slowly yielding to the necessity for compromise and reciprocity and that a gradual restoration of confidence and stability may reasonably be hoped for, provided the world is spared from further political upheavals.

India was providentially vouchsafed a satisfactory and well-distributed monsoon and freedom from political disorders. Bombay, whose fortunes are inextricably bound up with India's foreign trade on the one hand, and the prosperity of the local cotton and textile industries on the other, experienced a variable year. During the first six months of 1933-34, the volume of trade handled in the Port appreciably exceeded the budget expectation of a 2 per cent. improvement, but the imposition of heavy additional duties in order to safeguard indigenous industries, and the retaliatory measures adopted by other countries—notably Japan's boycott of Indian cotton from July to December, 1933—adversely affected the trade returns of the latter half of the financial year. After prolonged negotiations the anxiety caused by Japan's threat was relieved by the conclusion of the Trade Agreement between India and Japan which came into operation last January, and which, it is hoped, will help to restore prosperity to the Cotton Trade and Textile Industry of India. Taking the Port as a whole, the financial result of the year was practically an equilibrium between revenue and expenditure. If credit is given for the considerable reductions in rents and charges sanctioned by the Board during the year and calculated to amount to Rs. 2.12 lakhs during the period affected, the result of the year's working must, in present conditions, be regarded as satisfactory. An increase of 583,000 tons over the previous year's figure was recorded in the volume of imports and exports handled at the docks and bunders while the tonnage of vessels berthed at the docks was greater by over 100,000 net register tons.

One outstanding event in regard to which Bombay has good reason for satisfaction was the decision reached by Government, in consultation with the Bombay Municipality, the Port Trust and the G. I. P. and B. B. & C. I. Railways, to abolish, with effect from 1st April, 1934, the non-refundable Town Duty of one rupee per bale on raw cotton which had severely handicapped the Cotton Trade and the Port's revenues since its imposition in 1920. The abolition of this ill-conceived tax, combined with heavy reductions in railway freights and Port Trust charges, came as a long-sought relief to the Cotton Trade, the total estimated reductions amounting to the substantial figure of Rs. 40 lakhs per annum, of which the Port Trust contribution will be about Rs. 7 lakhs. Although much ground has been lost during the years of unavailing protest, it is confidently hoped that Government's courageous and statesmanlike measure, in which the Railways and Port Trust have wholeheartedly co-operated, will conduce materially to the return of prosperity to Bombay.

The diversion of trade to the Kathiawar ports was another important question which, thanks to strong representations from the Government of Bombay, has at last received serious attention from the Central Government. In April last Bombay received a welcome assurance that Government intended "to do all in their power to ensure to the Port of Bombay conditions of fair and equal competition with other ports and ability to hold its place in such conditions." Shortly after this announcement the Chairman of the Port Trust was summoned to discuss the financial position of the Port of Bombay with the Government of India and subsequently a Special Officer was deputed to Bombay to inquire into the whole matter and submit a report to Government. In the interests of all concerned, it is to be hoped that Government may before long

succeed in arriving at a settlement with the Maritime States of Kathiawar which—while leaving them at liberty to develop their natural trade to the full extent compatible with the capacity and facilities of their ports and the requirements of the hinterland they serve—will at the same time ensure that these ports are in future administered on a self-supporting basis similar to that obtaining in Bombay and the other major ports of India.

The encouraging trade returns for the first half of the year enabled the Trustees to give effect to a scheme of general relief to their leaseholders and tenants which had been contemplated for some time previously. From 1st October, 1933, a general remission of 10 per cent. was sanctioned on ground and storage rents above a certain datum line. In the case of the Cotton Depot and Ryan Grain Market tenancies, the remission was fixed at 15 per cent. with a further rebate of 5 per cent. to tenants willing to deposit a year's rent in advance. The effect of the full concession was to bring the Cotton Depot godown rents down to Rs. 400 a month, a substantial reduction on the figure of Rs. 675 fixed as the economic rent when the depot was opened in 1924. Similar remissions were sanctioned in the case of the jathas and open-sided sheds. These rental concessions, which will be reviewed yearly, are estimated to cost the Port Trust about Rs. 4½ lakhs per annum.

In view of the criticism to which ports are at present subjected on the score of their charges, a brief reference to the retrenchments effected and the relief afforded to trade by this Administration during the past twelve years may be of interest. The successive retrenchment campaigns carried out since 1924 have effected a reduction calculated to amount to some Rs. 42 lakhs a year, or nearly 31 per cent. in controllable expenditure. Only about two-fifths of the Trust's annual expenditure is in any way controllable; revenue to the extent of some Rs. 150 lakhs a year has to be earmarked for capital debt charges, taxes and other non-controllable payments. Despite a drop of some 25 per cent. in trade volume and receipts, and although deficits aggregating Rs. 52 lakhs have been met out of reserves, the Trustees have been able during the last six years to sanction reductions and remissions in charges by which trade has benefited to an aggregate extent of over a crore of rupees, whereas the only increase levied on the Schedule in force 12 years ago was the 12½ per cent. surtax and certain minor charges, necessitated in October, 1932, by the precipitous fall in revenue. That levy, estimated to bring in Rs. 15 lakhs a year, has been practically offset by subsequent reductions in charges. The expenditure ratio of the Trust has steadily fallen in spite of the diminution in receipts, and the reduction in the reserve funds has been largely counterbalanced by appreciation in the values of securities. The financial position of the Port of Bombay today will stand comparison with that of any port in the world. For nine years no new loan has been floated; the yearly debt charges have decreased by Rs. 10 lakhs and will continue to decrease progressively in future. In the matter of charges on trade Bombay cannot, of course, compare with subsidised ports whose development and maintenance is not financed out of port earnings, but if the charges as a whole are analysed, they will be found to compare most favourably with those of any self-supporting port administration offering equal facilities to trade and shipping. The Port of Bombay can justifiably claim to have taken timely steps to weather the depression and to assist trade as far as possible by reducing expenditure. This object is constantly kept in the forefront of the Board's policy, and every opportunity will be taken to effect further reductions as far as may be from time to time financially practicable.

The Revenue Estimates for the year under review were based on a modest expectation of an improvement of about 2 per cent. in receipts from direct trade sources over the corresponding actuals for 1932-33. The total estimated revenue was Rs. 249.79 lakhs, and this figure was reduced to Rs. 249.08 lakhs in the Revised Estimates prepared in January, 1934. The actual receipts amounted to Rs. 245.37 lakhs, the difference of Rs. 3.71 lakhs being chiefly due to the diversion of raw cotton exports to Bhavnagar and other Kathiawar ports during the last few months of the official year, and also to the fact that a number of exporters, instead of railing their cotton down to Bombay and shipping it over the wharves, despatched it from various coastal ports by country craft for overside transshipment in the docks, thereby escaping Town Duty and most of the wharfage charges. The measures taken to arrest this diversion have been referred to above. For purposes of comparison the receipts for the five years ending with the year under report are quoted below, the necessary adjustments

Bombay Port Trust—continued

having been made to allow for equalisation of the surtax throughout the period:—

				Rs.
1929-30	...	...	...	297.00 lakhs.
1930-31	...	...	...	254.98 "
1931-32	...	...	...	232.42 "
1932-33	...	...	...	223.76 "
1933-34	...	...	...	230.88 "

	IMPORTS (Tons)			EXPORTS (Tons)			TOTAL (Tons)		
	1932-33	1933-34	—	1932-33	1933-34	—	1932-33	1933-34	—
Docks	1,837,000	2,022,000	+ 185,000	1,655,000	2,054,000	+ 399,000	3,492,000	4,076,000	+ 584,000
Bundars	947,000	952,000	+ 5,000	250,000	244,000	— 6,000	1,197,000	1,196,000	— 1,000
Total	2,784,000	2,974,000	+ 190,000	1,905,000	2,298,000	+ 393,000	4,689,000	5,272,000	+ 583,000

The original expenditure estimate of Rs. 250.40 lakhs was reduced, by eliminating all avoidable items, to Rs. 248.12 lakhs in the revised budget; thanks to further economies effected in all departments the actual expenditure for the year was restricted to Rs. 245.34 lakhs, a saving of Rs. 5.06 lakhs on the original estimate and Rs. 2.78 lakhs on the revised. It is satisfactory to note that the ratio of working expenses to revenue in the year under review was 49.01 per cent., a decrease of over 2 per cent. on the previous year.

The revised budget estimates for the year anticipated a surplus of Rs. 27,759 under General Account and a surplus of Rs. 68,043 under Pilotage Account; the actual result was a deficit of Rs. 89,879 under General Account, which has been met from the accumulated Revenue Reserve Fund, and a surplus of Rs. 92,351 under Pilotage Account, which has been transferred to the Vessels Replacement Fund.

After meeting the year's deficit, the Revenue Reserve Fund showed a balance of Rs. 55.30 lakhs, the actual market value being Rs. 49.25 lakhs. It will be observed that, in addition to the Revenue Reserve Fund, the accumulated Sinking Funds and equated loan repayments amount to Rs. 589.99 lakhs, while adequate reserves totalling Rs. 33.03 lakhs have been set aside for special purposes, such as fire insurance, depreciation, and emergency replacements. Capital works financed out of Revenue Reserve during the years 1916 to 1921 amounted to Rs. 47 lakhs. No capital loan has been raised for the past nine

years, which constitutes a record in the history of the Trust. The capital balances in hand at the end of the year were over Rs. 4 lakhs.

The cargo handled at the docks and bunders amounted to 5,272,000 tons, an increase of 583,000 tons, as compared with the volume of the previous year. Imports accounted for about 56 per cent. and exports 44 per cent. of the total tonnage. The increase in tonnage was equivalent to 12 per cent. Imports increased by 6.8 per cent. and exports by 20.6 per cent. The following is a detailed comparison of the figures for the past two years:—

The heaviest decreases in imports were recorded under oils (vegetable, etc.) (1,505,000 gallons), cotton (114,000 bales), tea (81,000 packages) and piece-goods (77,000 bales and cases). The importations of bulk petrol, which reached the record figure of 22 million gallons in 1929-30, increased from 18 million gallons in 1932-33 to 20 million gallons in 1933-34. An increase in rice imports (73,000 tons) is also to be noted.

In the export trade there was an increase in cotton (143,000 bales), packed kerosene oil (228,000 gallons), seeds (121,000 tons) and wool (33,000 packages). Decreases in exports occurred under piece-goods (67,000 bales and cases), and petrol (104,000 gallons).

Vessels which entered the docks or were berthed at the Harbour Walls (excluding ferry-steamers) totalled 1,593 with an aggregate tonnage of 5,099,247 net register, as against 1,836 vessels with a tonnage of 4,691,183 in the preceding year.

The dry docks were occupied during the year by 149 vessels, as against 134 vessels in the preceding year 1932-33. The total tonnage increased to 561,468 tons, being 67,483 tons more than the previous year.

The Ballard Pier berth was used by 179 vessels during the year, and 297 postal and passenger trains were run to and from the station, connecting with the incoming and outgoing mail steamers and other large passenger liners. The additional passenger berth on the Alexandra Dock Harbour Wall accommodated 52 vessels.

Port of Southampton Topics

Docks Statistics for October show Increases.

Southampton Docks statistics for October reveal that the month was a particularly favourable one for the port.

The returns show that every phase of activity increased, as compared with October, 1933, and in consequence the month of October will probably prove to be the best of the year.

The number of vessels which entered the docks numbered 229, as compared with 222, and those which departed totalled 218, against 216.

Inward gross tonnage was slightly down, there being a decrease of 13,047 tons, but this was counteracted by the increase in outward tonnage, amounting to 33,735 tons. The net tonnage figures were highly gratifying, for inward the total rose from 789,726 tons in October, 1933, to 813,200 tons, and outward from 717,130 tons to 758,747 tons. The advance, therefore, amounted to 23,474 tons inward and 41,617 tons outward.

The volume of cargo dealt with advanced by 6,000 tons. Imports rose from 57,028 tons to 62,967 tons, and exports from 31,401 tons to 31,441 tons. The increases were, therefore, 5,939 tons as far as inward freight was concerned, and 40 tons in outward cargo.

There was scarcely any difference in the number of passengers who arrived during October this year and during the corresponding month last year, for the total was 11,672 as against 11,690. Travellers departing, however, were much more numerous, and the return of 14,333 was 1,172 in excess of the figure for October last year.

Trooping activities were also more intensive, 4,845 troops departing, as compared with 3,238, an increase of 1,607.

Empire Cargo Handled at Southampton Docks.

In connection with the visit to Southampton in November of the Agents General of Tasmania, Victoria and New South Wales and a number of Australasian merchants, the Southern Railway issued some interesting statistics for the current year regarding cargo handled at the docks. The figures for November and December have been computed on last year's basis.

These returns show that the volume of Empire cargo handled at Southampton this year amounted to nearly half a million tons. Imports from Empire sources aggregated 277,214 tons, which was 48.6 per cent. of the whole inward cargo, while exports to the Empire totalled 200,235 tons, which represented 54.6 per cent. of the entire outward cargo.

The bulk of the imports were from South Africa (190,209 tons). From New Zealand 11,610 tons of cargo arrived through Southampton and from Australia 2,334 tons.

The following figures show comparisons of traffic this year with 1932, when the old Southampton Dock Company was acquired by the Southern Railway.

	1932.	1934.
Tonnage of ships (gross)	2,369,698	17,132,000
Tons of cargo imported	246,560	570,175
Tons of cargo exported	175,051	386,685
Number of passengers inward	58,758	239,494
Number of passengers outward	63,850	243,526

"Georgic" and "Britannic" to call at Southampton.

Southampton learned, with considerable satisfaction, that the Cunard White Star Company have decided to send the motor-ships "Georgic" and "Britannic" here next spring, in order to cater for the cabin-class passenger trade from the Channel ports.

The "Britannic" and the "Georgic," since they came into commission in 1930 and 1932 respectively, have regularly used Liverpool as their home port for their Atlantic voyages. In the arrangements for sailings next spring both these vessels are scheduled to sail from Southampton and not Liverpool.

The success of these two vessels as cabin ships has been one of the bright features of recent activities in the depressed world, and there will be a warm welcome for the famous pair at Southampton.

On the other hand, it is interesting to note that the "Lancastria," which has found employment on the intermediate service from Southampton to New York in past seasons, is taking a place in the Liverpool service. She has recently been overhauled after a successful cruising season.

News from all Quarters

South Africa

The traffic through the main ports of South Africa for the month of August, 1934, will be seen from the following table:

No. of Ships ...	Cape Town	Port Elizabeth	East London	Durban
Freight in tons, unloaded ...	82,900	68,900	43,200	121,700
" " loaded ...	35,700	16,700	4,100	212,900
" " re-loaded	800	100	—	1,000
Total ...	119,400	85,700	47,300	335,600

From the beginning of December a significant innovation will be put into use on the South African coast. This is a new coastal light which will help to reduce the hazards of the shoreline on which the "Winton" and other vessels have recently come to grief.

Stomp Neus Point, overlooking St. Helena Bay, has been selected as the site of the new beacon, which is already under construction.

Although it is only of 200 candle-power, the light will be the only one between Port Nolloth and Saldanha Bay, a distance of three hundred miles. The white lamp, which is to operate automatically in a tower 15 ft. high and 31 ft. above low water mark, will be visible five miles out to sea.

Preparations are well advanced for the building of the greatest lighthouse on the South African coast, that on Paternoster Point. Here, due north of Saldanha Bay, and only a few miles from St. Helena Bay, the Railway and Harbour engineers are engaged in operations at Cape Columbine, also called Cape Castle after a curiously shaped hill, 228 ft. high.

Numbers of notorious hazards are marked on the charts around this part of the coast, but before the end of 1935 Paternoster Point will be served by a lamp of 4,000,000 to 5,000,000 candle-power—the eleventh largest in existence.

Great Paternoster Point lighthouse will be at the top of Cape Castle. Besides the lamp, the strongest on the coast and far surpassing such renowned beacons as those on the Lizard and on South Foreland in England, the station will contain an elaborate fog-signalling plant. The total cost is estimated at £16,000.

In view of recent mishaps construction is being hastened.

Mr. J. F. Craig, harbour engineer of Table Bay, has been promoted to the position of Harbour Advisory Engineer for the Union, and will be in charge of all engineering matters affecting ports in the Union from Swakipmund to St. Lucia Bay.

Since the retirement of Colonel Nicholson this important post has been allowed to lapse, and has now been revived, no doubt, on account of the new harbour schemes that will be started within the next two or three months.

Mr. Craig was mainly responsible for the big harbour developments at Port Elizabeth and East London, and has now before him a huge undertaking in the new basin of the Capetown Harbour, where berths are to be constructed for the new 25,000-ton Union Castle mail vessels now under construction.

Until Mr. Craig was appointed harbour-master of Port Elizabeth, in 1929, the chances of its ever having its new harbour were black. It is his scheme, with slight modifications, that has provided the new harbour.

Canada

The tonnage of vessels cleared from Canadian seaports in the first eight months of the current year was nearly 1,000,000 tons higher than in the corresponding period of last year. From January 1st to the end of August the total tonnage of vessels cleared from the ports of Halifax, St. John, Quebec, Montreal and Vancouver amounted to 18,621,339 tons, as compared with 17,777,290 tons last year.

The increase in lumber shipments was mainly responsible for the greater amount of shipping from the Maritime ports as well as from British Columbia. Decreased exports of grain, however, seriously affected the tonnage leaving St. Lawrence River ports. Increased exports of grain since these figures were compiled will greatly improve the showing of the grain exporting ports for the remaining months of the year.

Vancouver led all other Canadian ports in the tonnage of vessels cleared, increasing its tonnage from 6,763,323 tons to 7,731,713 tons. Montreal came second in importance with 4,429,324 tons, a reduction of 479,818 tons. Halifax came third with 3,015,707 tons, as compared with 2,720,836 tons last year. St. John increased its clearances of vessels by 222,286 tons to 1,760,836 tons, while the Port of Quebec decreased by 161,680 tons to 1,683,759 tons.

The Montreal Harbour officials have reduced the margin of safety on ocean-going vessels of 8,500 tons dead-weight or less, to 2½ ft. from the harbour or channel bottom as registered by the harbour gauge. This reduces the margin of safety one foot for this class of vessel, as compared with port requirements previous to this time. It will enable these vessels to carry a larger cargo of grain, and is considered within the margin of safety for vessels of that type. Larger freight and passenger steamers will comply with the old regulation requiring a margin of 3½ feet.

The 1934 shipping season has been the best yet experienced by the recently-developed harbour of Churchill. The number of ships to visit the harbour has been fifteen, as compared with ten of 1933 and 1932. These vessels have shipped over 4,000,000 bushels of wheat to Europe, as compared with only 2,700,000 bushels in the two previous years. Increases have also been noted in other goods handled at the harbour.

U.S.A.

An agreement has been reached between the "International Longshoremen's Association" and the "New York Shipping Association" which settles the wages and working hours dispute, and ensures the resumption of work until October, 1935, at all ports between Portland, Me., down to Hampton Roads, Va. The forty-hour week is to be retained, and the wages are to be increased, an arrangement by which 40,000 dock hands will benefit.

The San Francisco Chamber of Trade has recently brought out a memorandum dealing with the development of the harbour over the period 1921-33 from the point of view of the competition which it has had to face from the other harbours on the West coast of North America. At the same time, the report makes a number of proposals for maintaining San Francisco's important position, which it regards as being seriously threatened.

Philippines

Figures are now available for the harbour traffic of Manila and the smaller ports for the year 1933. The total number of ships entering the Philippine harbours during this period was 1,540 with 6,280,224 n.r.t., carrying a cargo of 1,429,703 tons valued at 149,361,523 Pesos. The number of ships clearing was 1,386 with 5,690,792 n.r.t., with a cargo of 2,098,519 tons valued at 211,542,105 Pesos.

Panama

The number of ships to enter the harbour of Cristobal during the year 1933 was 5,497 with a total of 21,570,429 n.r.t., whilst the number clearing was 5,495 with 21,572,692 n.r.t.

Ecuador

According to the statistics just issued by the Guayaquil Chamber of Trade, the total weight of exports handled in the harbour of Guayaquil in the first half of the current year amounted to 36,372 tons, valued at 37,465,793 Sucres.

Japanese Possessions

The number of vessels cleared in the harbour of Dairen in the second quarter of the current year was 1,120 with a tonnage of 2,099,671 r.t., as compared with 1,198 ships with a tonnage of 3,193,000 r.t. in the first quarter of the year. The total imports rose from 624,000 tons in the first quarter to about 750,000 tons in the second, and exports fell during this period by about 339,000 tons.

Japan

The Nippon Yusen Kaisha was among the first of the shipping companies to announce that its ships were both loading and unloading at the harbour of Osaka in the usual way, after the damage recently done there by typhoon. Now, however, the harbour authorities themselves have issued an official statement confirming that the damage has been completely repaired, and that the port is practicable both for ingoing and outgoing vessels.

Sweden

A further increase has been noted in traffic at the harbour of Stockholm. During the month of October, 355 ships were cleared, as compared with 321 in September. Of these, 108 with 89,802 n.r.t. were Swedish steamers and 95 with 83,488 n.r.t. foreign steamers, the remainder being motor vessels and smaller craft.

News from all Quarters—continued

Denmark

The following table shows the development of the number of steam and motor vessels entering and leaving the harbour of Copenhagen during the months of July, August and September, 1934 :—

	No. of Ships	R.T.
July	1,032	580,656
August	1,063	600,348
September	787	390,641

Latvia

Out of the total trade turnover of Latvia for the year 1933, amounting to 172,700,000 Lats, the value of the goods carried by sea was 151,300,000 Lats, almost 88 per cent. The harbour of Riga handled 83.3 per cent., Liepaya (Libau) 6.3 per cent., and Ventspils (Windau) 4.4 per cent. of the total traffic.

In the year 1933 some 665,000 tons of goods were imported through Riga, whilst only 575,000 tons were exported. Against these figures, however, it must be borne in mind that the total imports into Riga by rail amounted, during 1933, to only about 18,200 tons, and exports by rail to 6,200 tons. The number of ships to enter the harbour of Riga during 1933 was 1,649 with a tonnage of 900,080 n.r.t., and the number clearing was 1,660 with 917,158 n.r.t.

Belgium

The following table shows the number of ocean-going vessels entering the port of Antwerp during the months of September and October, 1934, as compared with the same months of the previous year :—

	1934		1933	
	September	October	September	October
No. of Ships	908	895	810	885
N.R.T.	1,770,779	1,781,652	1,618,392	1,827,126

The improvement in the volume of traffic in the harbour of Ghent continued in September, when it amounted to 176 sea-going vessels with a tonnage of 177,164 n.r.t., as compared with 155 ships with 151,309 n.r.t. for the same month of the previous year. For the first nine months of the current year, traffic shows an increase over the first nine months of 1933 of 89 ships and of 82,684 n.r.t.

Poland

A new record for the total goods traffic in the harbour of Gdingen was set up in August when 662,000 tons were handled, but this figure has been surpassed by that of October, which reaches 728,500 tons, as compared with the 611,000 tons of October, 1933. The details of this new record are not yet known, but it is to be supposed that there has been an increase in imports, the previous record figure having been reached on the strength of exports alone. For the first ten months of the current year, the total goods traffic amounted to 5,935,000 tons, as compared with the 5,031,000 tons for the same period of the previous year—an increase of 18 per cent.

The Polish Ministry of Finance has worked out a bill whereby the firms that during the next six years invest in the port of

Gdingen sums of money large enough to encourage its development, will be excused payment of income tax for a period not exceeding ten years, the period of exemption to expire in every case on the 31st December, 1945. In this connection, the official "Gazeta Polska" contends that many other harbours were only elevated to their present importance by the granting of privileges, similar at least in principle.

The harbour of Gdingen may also be enlarged shortly by the building of a new repair dock. The Italian shipping firm of Cosulich is at present carrying on negotiations in Warsaw for the construction of such a dock, which they would use for the repairing of the Italian ships of a new line they propose to organise for traffic between Gdingen and Trieste.

Danzig

The goods traffic in the harbour of Danzig, which had been on the increase during the summer, started to decline after September, though the figures remained above those for the same months of the previous year. Imports in September amounted to 62,137.8 tons (as compared with 58,917.3 tons in September, 1933), and exports to 513,244.5 tons (as compared with 409,171.4 tons). In October, the number of ships entering the harbour sank to 377 with 257,260 n.r.t. from the September figure of 456 ships with 312,881 n.r.t. Of these, only 142 were carrying cargo, as compared with 157 in September. In exports, the number of ships fell from 446 to 405, and the tonnage from 295,021 to 284,842 n.r.t. The number of these carrying cargo fell from 408 with 268,673 tons to 363 with 264,060 tons in October. This reduction is largely due to the success of the various measures taken by the Polish Government in diverting traffic to Gdingen.

The new harbour dues are given in a special edition of the official bulletin of the Free City, and a number of reductions and special rates are included. The bulletin also gives the storage fees per square metre for the store-houses, and the new charges for the use of cranes.

Germany

The following table gives the tonnage of ships entering and leaving the harbours of Bremen, Emden and Stettin, and that of goods imported and exported through them during the period January-August, 1934 :—

	Bremen	Emden	Stettin
N.R.T. entering	5,436,000	1,564,000	1,658,000
N.R.T. leaving	5,407,000	1,606,000	1,657,000
Goods imported, in tons	1,639,000	1,524,000	2,034,000
Goods exported, in tons	1,724,000	1,810,000	900,000

Spain

The Ministry of Public Works has been authorised by decree to commence work on the construction of a harbour for smaller vessels at Castellon. The cost is estimated at 2,314,814.18 Pesetas, to be divided over a period of five years. In addition to this, work is to be commenced on the construction of a mole at the Citadel Santa Catalina in the harbour of Puerta de la Luz in the Canary Islands. The cost of this will be 6,898,937.06 Pesetas, also to be paid over a period of five years.

Manchester Dock Strikers Resume Work

After a general strike, extending over four days, and an overtime strike covering a period of fourteen weeks, the dock workers at Manchester resumed work under the normal conditions of labour on Monday, November 26th.

On August 13th last the Manchester dockers, independently of their Union, refused to work overtime. No notice or reason was given to the Company but it was unofficially understood that the men's action was an attempt to hasten negotiations for the restoration of the cut in wages made in 1932.

The Transport and General Workers' Union and the Ship Canal Company regarded the strike as a breach of the national agreement, and both sides appealed to the men to resume normal working. The Union eventually took disciplinary action by expelling three of their local members. Automatically these men became unemployable by the Company and their reinstatement, although a domestic matter within the Union, became an added issue of the overtime strike.

While the Ship Canal Company has always made it clear that it desired to keep overtime at a minimum inability to work overtime when necessary was interfering seriously with the movement of vessels and the handling of perishables and the trade of the port was suffering in consequence.

On November 20th the Company detailed men for overtime after having posted a notice on the previous day to the effect that men so detailed would be suspended if they refused work, except on account of sickness or on other reasonable grounds. The men detailed for overtime did not sign on and were in consequence suspended. A general strike took place on the following day.

Representatives of the men sought an interview with the Company and offered to advise a resumption of work if the Company agreed to reinstate the men suspended for refusing overtime together with the three men expelled by the Union, and further agreed to a conference with a committee of the men to discuss local conditions. It lay outside the power of the Ship Canal Company to take any action with regard to the expelled men, nor could the Company set aside the terms of the national agreement and enter into local discussions except through the regular machinery of negotiation, but it expressed itself willing to reinstate the workers suspended by the Company if normal working conditions were resumed. A conference then followed between the Port Authority and the Steamship Owners' Association to arrange for the work of the port to be carried on in the event of a continuation of the strike. At a meeting on Saturday, November 24th, the men accepted the Company's terms, and work was resumed on November 26th.

Clyde Navigation Trust

Annual Election of Members

SOMETHING of a transformation has come over the Clyde Navigation Trust as a result of the Glasgow Municipal Elections this year. For the first time there is a young, active body of representatives sent from the Corporation of Glasgow, displacing members who have more or less been automatically re-elected year after year over a number of years, as a result of the Labour majority now in power in the Corporation.

During the Municipal Election the Clyde Trust and its administration featured prominently in the Election Addresses of both Moderate and Labour Candidates, and was the subject of considerable comment at a number of Election Gatherings. The present Labour representation, hitherto consisting of only two members, now constitutes about 25 per cent. of the Trust's total strength, and it is anticipated that this active minority may serve to create considerably more interest and activity within the Trust than has been apparent in recent years, the general consensus of opinion in Glasgow circles being that, provided politics are eliminated, their advent should be useful in promoting a reasonably progressive policy for the Port and City.

These members have already given evidence of their desire to take a practical interest in the affairs of the Trust at the annual meeting called on the 20th November for the election of Chairman, Vice-Chairman and Committees. At this meeting Mr. W. F. Robertson was again elected to the chair, but for the first time opposition was raised to the election of the Deputy-Chairman. Mr. Robertson duly proposed the re-election of Mr. W. Cuthbert, the Chairman of the Clyde Shipping Company, as Deputy-Chairman, but objection was immediately taken to this proposal and an amendment proposed nominating Mr. John Stewart, the Deputy-Chairman of the Corporation, who for a number of years has been a member of the Clyde Trust, to this office. In moving the proposal, Mr. T. A. Kerr suggested that it was done not from a point of view of opposing other members' views on every question in the administration of the Clyde Trust, but purely on the ground that Mr. Stewart had the necessary ability and experience and the interests of the Clyde Trust at heart. He suggested that it would be a good thing that the Clyde Trust should not let it go out to the public that they were determined, at all costs, to adopt every expedient to prevent any particular section of its constitution being represented in office, and thought it would be too apparent to the public that that was their intention.

Councillor Andrew Hood seconded, pointing out that it was desirable in the interests of the various bodies represented on the Trust that these bodies should be represented by the office bearers they appointed, and referred to the importance of the Glasgow Corporation having twelve members on that body.

On a vote being taken, Mr. Cuthbert was re-elected by 24 votes to 11.

A considerable discussion occurred on the re-appointment of Committees and Conveners. Hitherto proposals to fill vacancies had been submitted from the Chair and automatically passed, but on this occasion Mr. P. J. Dollan took exception to this procedure, and in connection with the General Purposes Committee, which is the key Committee on the Trust responsible for the major decisions regarding its administration, and insisted that other members should be considered. There was no doubt, he said, that when the names on that Committee went out to the public it would be thought it had been deliberately arranged to prevent fair representation being permitted on the main Committee of the Trust. It at once created the opinion that the Trust wanted to conduct its business, as it had done in the past, in semi-secrecy. A number of members were there representing the Glasgow Corporation, and they were all intensely willing to co-operate and assist the Trust in every possible way for the benefit of trade and commerce of the city, but they protested against being denied the opportunity of offering their co-operation on that Committee. He suggested that the Committee looked like a "packed jury."

The Chairman pointed out that the Committee consisted of the Conveners of all Committees under the Standing Orders—the Lord Provost and two other representatives, who at present were Dr. Bruce Murray, a member of the Corporation, and Mr. G. W. Service.

Mr. Dollan referred to the fact that there were 42 members on the Trust, and of these, with the exception of Dr. Bruce Murray, there was no representative on behalf of the Corporation of Glasgow. He suggested that the Corporation should receive more consideration than it was doing at the hands of the Chairman and his colleagues if they wanted good-will between the two bodies, and he appealed to the Lord Provost for his support in order that they might secure the maximum representation for the Corporation on the Trust.

Dr. Bruce Murray thereupon withdrew his name from the Committee, and the names of Mr. John Stewart and Mr. Hector McNeill were duly proposed to take the place of Dr. Bruce Murray and Mr. Service. As Mr. Service did not withdraw a vote was taken, with the result that Mr. John Stewart was elected to the vacancy, Mr. McNeill being defeated by 23 votes to 11.

With regard to the remaining Committees, these were amicably agreed upon, and in connection with the special Committee for the development of the Shieldhall Dock Estate, the Trust agreed to elect three representatives from the Corporation to this Committee—this being one of the principal features brought out in the recent election, namely, that the Trust should adopt a progressive attitude and develop this estate industrially.

For the first time in 27 years there was an election for the ratepayers' representatives to the Clyde Trust. The ratepayers or duespayers are represented by 18 members, and each year six fall to retire. For some time past there has been a growing feeling in Glasgow that new blood should be introduced to the administration of the Port. This can be most appropriately exemplified by quoting the following leading article from the "Daily Express":—

A Plea for Youth.

"The Clyde Trust controls the Port of Glasgow. It holds the key to the prosperity that should be Glasgow's. It has done much for the city. It could do a great deal more. It owns 600 acres of land adjoining the river at Shieldhall, ideal situation for the accommodation of new industries. The Trust has huge resources in money. It could afford to boost the Clyde, attract new industries, increase its own revenues, and do Glasgow more than a good turn.

"But the Trust moves slowly. Its pace is the pace of old age. A few months ago it had five members whose ages totalled 400 years! The average age of its present members is too high.

"These men have served the Clyde well. But new men, young men, virile men are knocking at the door. The time to admit them has arrived. It is good news that the first election of members for twenty years is to be held next week.

"It will be better news if some of the new blood is injected into the Trust. Glasgow should watch this election. The city has a bigger stake in it than the man in the street realises."

The Provision and Allied Trades of Glasgow approached the Clyde Trust for the nomination of one of their members, putting forward a strong case for representation based upon the fact that these trades have not only been associated with the considerable increase of shipping and trade from the Dominions, which has been built up in the last three or four years, but are the only trades which, during the depression, have shown consistent increases to the Port. In view, however, of receiving the assurance that they should be considered for the next vacancy they withdrew their nominee.

The Storage and Transport interests, however, who were not represented on the Trust, put in two last-minute nominations, with the result that a contested election was fought. The various interests represented by the retiring members were very highly organised, and the six retiring members were duly re-elected, but it was significant that the last-minute contestants polled two-thirds of what proved to be a heavy poll.

It is generally anticipated that another election will follow next year.

Llandudno Sea Defences

Application is being made by the Llandudno Council for sanction to borrow £10,943 for the purpose of sea defence work on the West Shore.

Submitting his flood prevention scheme to the Council, the Surveyor, Mr. W. T. Ward, said that at storm periods it was not the actual high-water level that caused the flooding. The damage was caused by the crests of the waves being carried over the sea wall by the wind and the failure of the water to return on account of the landward fall of the promenade, and because the outlets were tide-locked.

The Surveyor's scheme provides for the erection of a second sea-wall, about 20 feet landwards, with openings which can be barricaded at storm periods. The effect will be to trap the water in the form of a lake until the fall of the tide.

BROMBOROUGH PORT DREDGING AND RECLAMATION CONTRACT



1. Dredging the Dock.

2. Filling up the Reclamation Ground.

**WESTMINSTER
DREDGING
COMPANY LTD.**



32, VICTORIA STREET, WESTMINSTER, LONDON, S.W.1

Telephone—Victoria 9894

Telegrams—Dredgeria, Sowest, London

Cables—Dredgeria, London

Code—A.B.C. 5th Edition

THE DOCK & HARBOUR AUTHORITIES' LIBRARY

* Postages on all these books are extra, and vary according to the country for which they are required. These postage rates can be had on request.

PORT ADMINISTRATION AND OPERATION.—By Brysson Cunningham, D.Sc., M.Inst.C.E. Price 13s. 6d.

CARGO HANDLING AT PORTS.—By Brysson Cunningham, D.Sc., M.Inst.C.E. Price 13s. 6d.

PORT DEVELOPMENT.—By Roy S. MacElwee, Ph.D. Price 30s.

WHARF MANAGEMENT, STEVEDORING AND STORAGE.—By Roy S. MacElwee, and Taylor. Price 21s.

THE IMPORTERS HANDBOOK.—By J. A. Dunnage. 10s.

THE DESIGN, CONSTRUCTION AND MAINTENANCE OF DOCKS, WHARVES AND PIERS.—By F. M. Du-Plat-Taylor, M.Inst.C.E. Price 70s.

HARBOUR ENGINEERING.—By Brysson Cunningham, D.Sc., M.Inst.C.E. Price 30s.

THE DOCK AND HARBOUR ENGINEERS REFERENCE BOOK.—Price 9s.

MARINE WORKS.—By Ernest Latham, M.Inst.C.E. Price 16s.

DOCK AND LOCK MACHINERY.—By W. H. Hunter, M.Inst.C.E. Price 17s.

STOWAGE OF CARGO.—Price 42s.

PORT ECONOMICS.—Price 6s.

EXCAVATING MACHINERY.—By W. Barnes, M.I.Mech.E. Price 42s.

PORTS AND TERMINAL FACILITIES.—By Roy S. MacElwee, Ph.D. Price 30s.

DOCK ENGINEERING.—By Brysson Cunningham, D.Sc., M.Inst.C.E. Price 42s.

MOTOR SHIPPING.—By A. C. Hardy, B.Sc., F.R.G.S., A.M.Inst.N.A. Price 15s.

PORT STUDIES.—By Brysson Cunningham, D.Sc., B.E., M.Inst.C.E. Price 25s.

BELT CONVEYORS AND BELT ELEVATORS.—Price 31s.

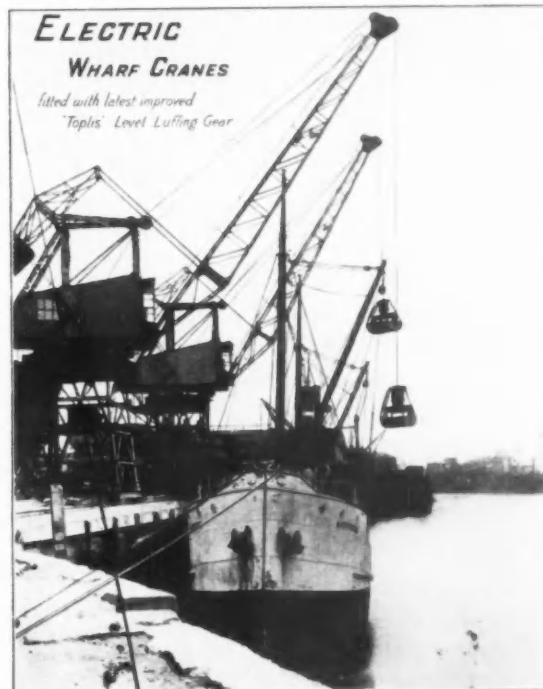
THE RECLAMATION OF LAND FROM THE SEA.—By F. M. Du-Plat-Taylor, M.Inst.C.E. Price 21s.

MODERN HARBOURS.—Conservancy and Operations.—By E. C. Shankland. Price 21s.

DREDGING OF HARBOURS AND RIVERS.—By E. C. Shankland. Price 42s.

THE DOCK & HARBOUR AUTHORITY,
17-19, Harcourt Street, London, W.1.

ANDERSON



CRANK OPERATED RIGID LUFFING GEAR
NO LUFFING ROPES
BALANCED JIBS

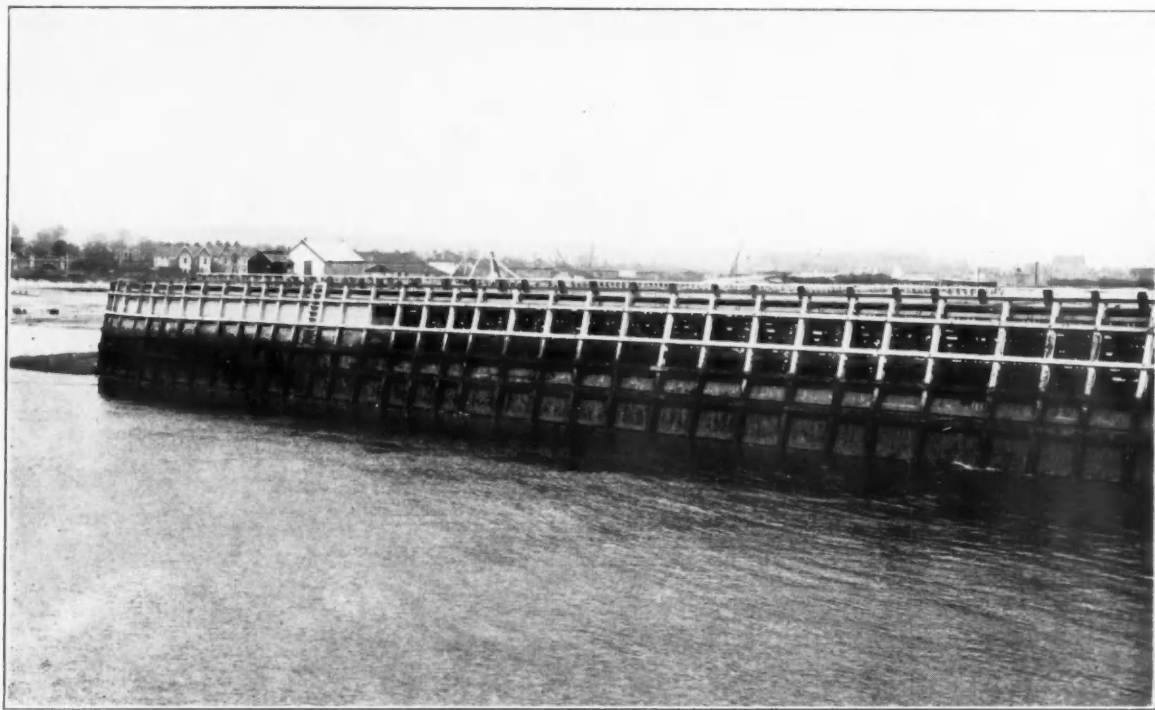
*Phone :
Carnoustie
No. 14

THE ANDERSON-GRICE CO. LTD.
TAYMOUTH ENGINEERING WORKS - CARNOUSTIE - SCOTLAND

*Grams :
Diamond,
Carnoustie

British Guiana (Demerara) Greenheart

A Strong Timber for Marine Construction

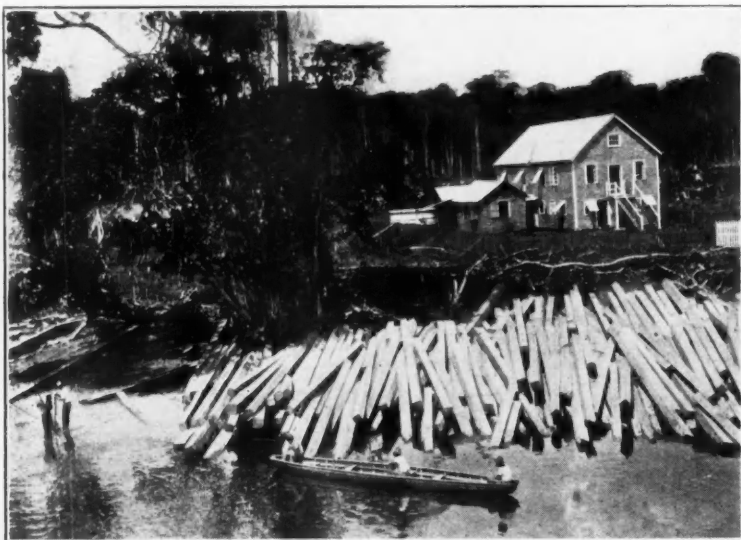


Photo]

East Pier, Shoreham Harbour, Greenheart and Australian Jarrah. [Sussex Press Illustrations

THE true Greenheart [*Ocotea Rodioei* Mez. (*Nectandra Rodioei* Schomb.)] is cut in merchantable quantities only in British Guiana along the banks of the Essequibo, Demerara and Berbice Rivers.

The tree is practically an evergreen and grows to a height of from 60 to 100 ft. and yields hewn square logs of shipping specification up to 60 ft. in length and from 11 to 24 ins. square calliper measure, although logs 21 ins. and up are not common and command higher prices than those of smaller dimensions. The trees, when felled, are hewn to parallel sides in the forest, and on account of the straight and round bowl of the Greenheart tree, logs squared to their greatest dimension seldom vary more than 1 to 1½ ins. on adjacent faces, and the hewn section at the butt is rarely found to exceed the section at the top end of a 50-ft. log by more than 2 ins. The butt ends of these logs are "snaped" or sledged to facilitate their being drawn out of the forest to the nearest creek where they are floated on specially constructed rafts (Greenheart will not float, its specific gravity when green being from 1.08 to 1.23, or about 75 lbs. per cub. ft.) to the loading beaches where they are taken aboard ocean-going steamers for shipment to all parts of the world. In Europe large stocks of Greenheart are held in Liverpool, London and also in Holland.



Greenheart Logs awaiting shipment in British Guiana.

Demerara Greenheart was first imported into England about 1770 when a small cargo of logs was landed in Liverpool. It was at once realised by engineers of that time that the tremendous strength and hardness of this wood rendered it admirably suitable for all classes of heavy constructional work. It was not many years after its first use in this country in contact with sea water that Greenheart was found to withstand the ravages of marine borers where all other woods had failed, and its use was employed extensively in the construction of piers, jetties, wharves, lock gates, dock gates, ship-building and in a hundred other capacities.

That was some 150 years ago, and although man has, in this lapse of time, delivered up products of Nature's hand hitherto undreamed of, he has been unable to find in any quarter of the earth a timber which can truthfully claim to supersede Greenheart as the most suitable, and in the long run, the most economical wood for marine construction. Greenheart holds second place of the eight woods rated as A.1. at Lloyds, the first place being given to Teak alone.

Marine engineers from earliest times have been faced with the problem of protecting works in contact with sea-water from the attacks of sea-borers. The classic writers of nineteen centuries ago refer to the sheathing of the hulls of ships with metal as a protection against the ravages of these pests.

Of marine borers, the most frequently encountered are the *Teredo Navalis* and the *Limnoria Lignorum*, both of which may be said to be present in all salt water. They will often work together on the same timber pile, the *Teredo* burrowing in the direction of the grain of the wood and the *Limnoria* making its attack by boring at right angles to the grain. In some latitudes these will riddle a pile, especially one of soft wood, in a few months and render it unsafe to carry the superstructure of a pier, jetty or wharf. The harder the texture of the timber employed in infested waters, the more is the onslaught of the borers retarded, by virtue of the fact that they are naturally unable to make the same progress as in the case of a wood of one of soft species, but they will, nevertheless, in due course complete their work of destruction.

Therefore hardness alone, while being beneficial, is not sufficient protection to a wood against the ravages of marine borers. Greenheart is an exceedingly hard wood and its strength is unsurpassed. It is, however, the presence of an Alkaloid known as Bebeerine, found only in Greenheart, and also ingrowths in to the pores of the wood, known as Tyloses to which Greenheart owes its resistance to

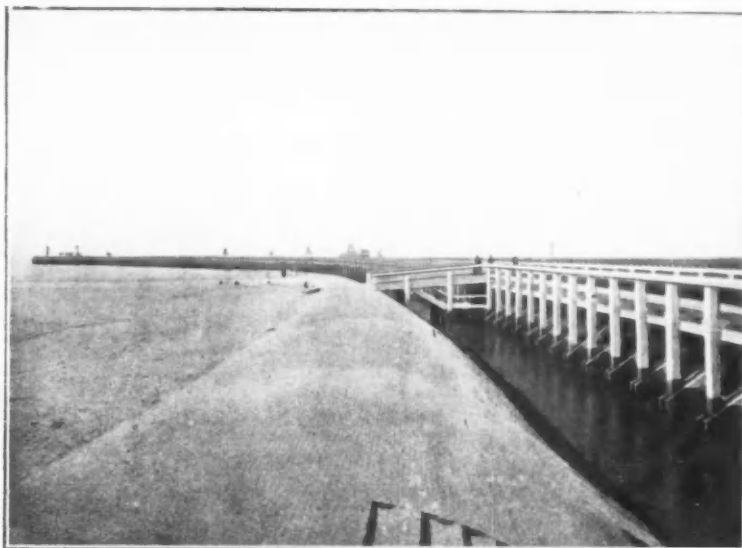
British Guiana Greenheart—continued

the attacks of these pests. This fact is confirmed by George Barger, M.A., D. Sc. F.R.S., in a passage from his "Report on Biological Work and on the effect of Poisons on Teredo" which appears on page 25 of the Fourth (Interim) Report of the Committee of the Institution of Civil Engineers on The Deterioration of Structures in Sea Water.

"Nature of Protection of Greenheart."

"A minor result, of theoretical interest only, may be referred to. On June 17th, 1921, three blocks (of Baltic fir) were fixed which had been impregnated with an alcoholic extract of Greenheart saw-dust of such strength that the concentration of protective substances would be the same in the fir as in the Greenheart. One of these was removed on November 17th, 1922, and found to be quite free from Teredo (after two breeding seasons). Another one which had only one-tenth of the amount of Greenheart extract contained five Teredos. It seems, therefore, that Greenheart owes its protection not to its mechanical nature, but to a chemical constituent soluble in alcohol (probably the alkaloid bebeerine).

Greenheart has played a leading part in the construction of many important undertakings. All the



Greenheart Jetty at Ostend, Belgium.



Greenheart Lock Gates, Manchester Ship Canal.

the Results of their Investigations up to the date when the whole was published as a volume in 1920, entitled *The First Report of the Committee of the Institution of Civil Engineers Appointed to Investigate The Deterioration of Structures in Sea-Water* (H.M. Stationery Office, 30s.).

In this extremely interesting and illuminating work many references are made to Greenheart by the corresponding members of the Committee from all quarters of the world which in themselves bear out the claim of this timber, to be the most resistant to the ravages of marine borers, of any timber yet found and obtainable in commercial quantities. This fact is confirmed by the Committee in the General Report Embodying the Results of their Investigations by the following extract.

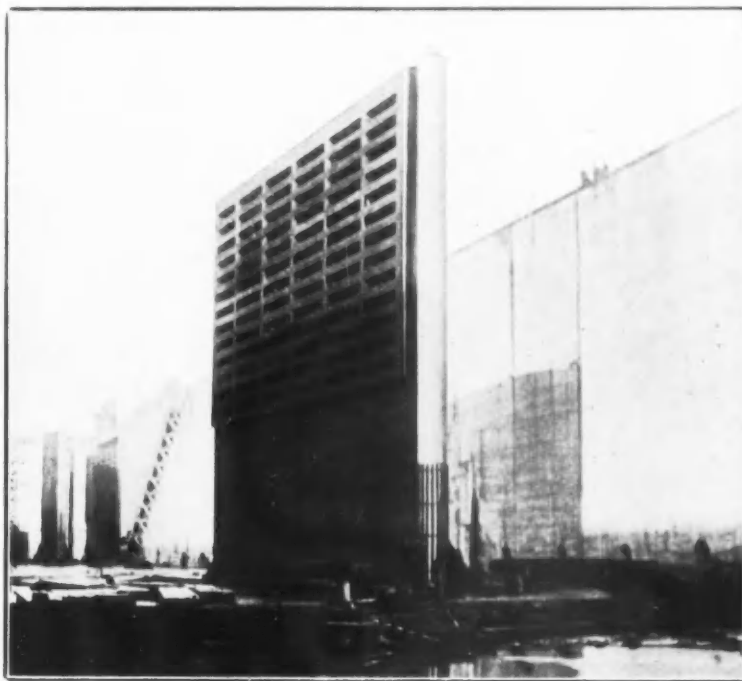
(†) "21.—As may have been anticipated, the opinion of the Committee points to Greenheart as being the timber which is most resistant to the attacks of marine organisms, although according to the Reports and Papers which have been submitted from Corresponding Members, there are certain other timbers which are alleged to possess protective and preservative proper-

†Deterioration of Structures in sea-water. First Report page 269.

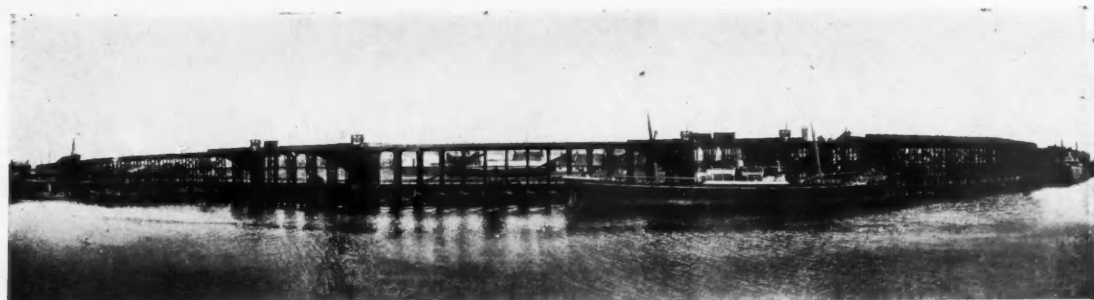
50 pairs of lock gates of the Manchester Ship Canal are of Greenheart, likewise most of the lock gates of the Bridgewater Canal. All the dock gates, timber jetties and wharves under the control of the Mersey Docks and Harbour Board are built of Greenheart, and an outstanding example of the durability of this wood is shown by the fact that when it became necessary to remove any of the dock gates for the purpose of widening and deepening the channels, the Greenheart of which they were built was found to be still perfectly sound and was used again in the construction of the enlarged gates. To illustrate this, the history of the Greenheart in the gates of the Canada Dock may be cited. These gates were built originally in 1856 and reconstructed in 1896 to suit the greater depth of the dock, the same Greenheart was used again, and now, in 1932, after 76 years of immersion, is as sound as ever it was.

In 1916 a Special Committee was appointed by the Institution of Civil Engineers, to investigate into the deterioration of structures of timber, metal and concrete, when exposed to the action of sea-water in various localities, and to carry out research as to the measures of preservation of such structures.

Reports were received by the Institution from a great number of corresponding members of the Committee, Engineers both in this country and different localities throughout the world on the action of sea-water on the structures under their supervision. These reports were collected together, notes made upon them by Mr. M. F. G. Wilson, a member of the Special Committee and finally conclusions drawn in The General Report of the Committee Embodying



Dock Gate for the 130 ft. Entrance, Gladstone Dock, Liverpool. (These are the largest gates in England).

British Guiana Greenheart—continued*Coal Staiths at Blyth, Northumberland, built in 1884. Greenheart Sub-structure.*

ties, these claims have not always, however, been borne out by the results achieved in the works."

In making a general summary of its various remarks, the Committee conclude—

(*) "1st.—At the home ports, Baltic timber, which has been properly creosoted, would resist the attack of the Teredo or Limnoria to an extent which would, it is considered, justify the adoption of such treatment.

"2nd.—The life of sea structures or portions of them, in connection with home ports, would be further prolonged by the use of Greenheart and to some extent

* Deterioration of Structures in sea-water. First Report page 277.

by the employment of Jarrah and other Australian Gums, in lieu of creosoted timber.

"3rd.—In tropical waters where the Teredo and Limnoria are much more active than around the British coasts, the use of creosote as a protection, or preventative, would not be justified by the results produced."

Greenheart has been employed in almost every latitude in connection with marine work, and its capacity to outlast any other wood under various conditions of salt water has been amply proved.

The price of Greenheart is now well within the range of pitch pine, etc., and it is imported into this country by Messrs. David Roberts, Son and Co. (Bootle) Ltd., Rimrose Road, Bootle, Liverpool 20, who have specialised in this valuable timber for many years now.

Seaborne Goods Traffic of the Lower Weser Ports during September, 1934.

According to official statistics, 664 sea-going vessels with carrying capacity of 675,038 net registered tons arrived in Bremen ports in September, compared with 722 vessels with 702,648 net registered tons in August, 1934, and 641 vessels with 562,562 in September, 1933.

Arrivals in Bremen City ports in September, 1934, amounted to 588 vessels with 451,491 net registered tons, compared with 593 vessels with 430,745 net registered tons in August, 1934, and 568 vessels with 380,587 net registered tons in September, 1933. In Bremerhaven 97 vessels with 233,352 net registered tons arrived in September, 1934, compared with 153 vessels with 280,636 net registered tons in August, 1934, and 103 vessels with 191,206 net registered tons in September, 1933.

716 vessels with 683,343 net registered tons sailed from Bremen ports in September, 1934, as against 687 vessels with 670,211 net registered tons in August, 1934, and 624 vessels with 610,285 net registered tons in September, 1933.

In Bremen City ports 637 vessels with 469,715 net registered tons sailed, against 560 vessels with 422,911 net registered tons in August, 1934, and 544 vessels with 404,877 net registered tons in September, 1933. In Bremerhaven 83 vessels with 214,703 net registered tons sailed, as compared with 136 vessels with 250,226 net registered tons in August, 1934, and 90 vessels with 210,406 net registered tons in September, 1933.

From January to September, 1934 (1933) 5,048 (4,913) vessels with 6,050,712 (5,333,044) net registered tons arrived at Bremen ports. 5,246 (4,972) vessels with 6,070,095 (5,345,288) net registered tons sailed, during the same period.

Weser Inland Shipping in September, 1934.

The catastrophic water conditions of the Weser continued during September. The unfavourable water conditions have exceeded even those of September, 1921, as the draft depth on the Middle Weser at that time was 10 centimetres more than this year, when it was 89 centimetres.

In October, up to the 15th the position became still worse; for the average draft depth decreased five centimetres further, and if there is not considerable rainfall in the meantime the whole of October, 1934, will bring a very bad average.

The discontinuation of inland shipping on the Upper Weser and the difficulties on the Middle Weser, due to the abnormal water conditions, naturally caused a great fall in goods traffic on the whole river. Hanover Munden during the whole of the month only had a turnover of 67 tons.

Traffic through the Bremen Weser Lock at 101,800 tons in both directions was 31,400 tons, or 24 per cent. less than in August, and also 26,200 tons, or 21 per cent. less than September, 1933. Downstream goods carried decreased at 70,800 tons, by 26,800 tons, compared with August.

During the past nine months of the year 1,115,800 tons passed through the lock, against 1,061,900 tons in the same period of the previous year. There is therefore, still an increase, but this falls solely to the increase in the first quarter.

Two New Records at Southampton Docks.

Two famous ships, which are regular callers at Southampton, have achieved notable accomplishments recently.

The Canadian Pacific liner, "Empress of Britain," on her last Atlantic crossing established a new record for a round voyage to Canada from and to a British port, and the North German Lloyd liner, "Bremen," completed her 100th round voyage between Europe and New York.

The "Empress of Britain" completed the remarkable feat of crossing the Atlantic sixteen times in 108 days, and accomplished the last round trip between Southampton and Quebec in 11 days 4 hours 47 minutes. This was nearly six hours better than her previous record.

The "Empress" is now being overhauled in preparation for a round-the-world cruise.

The "Bremen," which wrested from Britain the Blue Riband of the Atlantic on her maiden voyage, and broke both west-bound and east-bound records, succeeded on her 100th crossing to reduce by one hour 29 minutes her previous best time for the west-bound voyage. She crossed in four days 14 hours 27 minutes at a speed of 28 knots.

Since she entered service the "Bremen" has steamed a distance of 735,030 sea miles, and has carried 232,195 passengers.

Her commander, Commodore L. Ziegenbein, celebrated his 60th birthday on the day the "Bremen" completed her voyage.

Dublin Tugs available as Tenders.

At a meeting of the Dublin Port and Docks Board held on 25th October, it was announced that the Harbour Master be directed to take all necessary steps to have the Board's tugs made available for service as tender to liners anchoring within the limits of the Port for the purpose of conveying passengers and their personal luggage from or to the quays or wharves of the Board at a charge of £7 10s. per hour or part of an hour with the minimum charge of £30. It was further decided that any vessel anchoring within the limits of the Port and not entering the River Liffey, or making use of the quays or wharves of the Board, should be liable to a tonnage rate of one farthing per ton.

The Chairman (Mr. Laurie) said that the question of providing tender facilities for liners had been under consideration for some time. Mr. McGrath and himself had had several discussions on the matter, and they had several inquiries from companies who were preparing their cruising campaign for 1935. They had made representations to a committee of the whole Board with regard to the matter, and he was glad to say they were unanimous in desiring to put Dublin on the cruising map. They had been told that their tenders were approximately 200 per cent. better than those at other ports of call on the schedule of cruising liners. That was very creditable. He assured every liner calling at the Port of a hearty welcome and every possible facility.